The Journal of the American Medical Association

Published under the Auspices of the Board of Trustees

VOLUME LII CHICAGO, ILLINOIS, JANUARY 2, 1909 NUMBER 1

Original Articles

PRINCIPLES UNDERLYING THE OPERATIVE TREATMENT OF STRABISMUS *

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It seems profitable to discuss here chiefly principles that are but partly recognized, forgotten or ignored, rather than those regarding which there is full recognition and agreement. We never forget that the normal contraction of a muscle brings its origin and insertion closer together. But it often seems to be forgotten that such normal contraction does not arise in the muscle itself, but is absolutely dependent on the nerve impulses coming to the muscle from the motor centers. Functionally the muscle has no existence apart from the nerve supply. Even its anatomic integrity depends on receiving the proper nerve impulses. If these are cut off permanently the muscle atrophies completely. If they are seriously interfered with degenerative changes set in. If they are diminished the muscle shrinks; if they are increased it hypertrophies. No operative readjustment of the ocular muscles can be permanent that is opposed by these nerve impulses; none can be completely successful that is not supplemented by them.

Our so-called "muscle operations," done on tendons of insertion, are attempts to modify the final mechanical results of nerve impulses. The position of an eye at any instant, or its habitual position, depends on nerve impulses. Only when we can not alter such impulses are we justified in attempting to change their mechanical effects by operation. The size, strength and habitual contraction of the different ocular muscles depend as much on the nerve impulses going to them, and as little on congenital peculiarities of the muscles themselves, as do the size, strength and habitual contraction of the muscles that give the soldier his erect carriage or the musician his perfect technic.

Normal binocular vision, as developed in man, rests on highly complex, exact reflex movements. The normal binocular movements are continuously guided by the sense of diplopia and the desire to avoid it. Between the seeing of the two eyes and the movements of the two eyes there is the most minute and comprehensive co-ordination, and the reflex to diplopia, the "fusion sense," dominates every normal ocular movement.

Strabismus is a fault of binocular movement. Somewhere in the co-ordinating mechanism, or the structure it controls, there is a break, a defect. The mechanism of co-ordination is still functionally active, although in some respects crippled and imperfect. The investigation of the particular kind of fault in the co-ordinating mechanism must, in each individual case of squint, precede the selection or planning of any rational operation for its correction.

TWO CLASSES OF OPERATIVE CASES

The peculiarities of each particular case must be considered, but, in a general way, all cases may be placed in two groups: (A) Those in which the co-ordinated movements of the two eyes are to be guided by the visual impressions made on both, cases capable of true binocular vision, more or less completely developed; (B) cases in which the binocular movements must be guided by the visual impressions of one eye, the eye which "fixes." In the former class the problem is much more complex, the operation is to be an adjuvant, carefully planned to give assistance to the development of and utilization of nerve impulses. In the latter class the nerve impulses have been developed, and, in a sense, fixed, and the operation merely adapts the parts to secure from these impulses the best mechanical results.

In the past, operative success has been most frequently achieved in this latter class, because the nerve impulses to be dealt with, those of fixation with a single eye, were best understood. Normal binocular fixation is still an obscure subject, and of imperfect and abnormal types of binocular vision, such as exist in many cases of squint, we know very little. The nerve impulses connected with such anomalous use of the eyes are pretty certain to overcome and nullify attempts at operative correction, planned without attention to their influence. When, however, we come to understand better the abnormal, but definite and sometimes very persistent co-ordinations that exist between the perceptions and the movements of the two eyes in established strabismus, operative measures more in harmony with the real need of the case may yield good results. In Class A operation can disturb the existing co-ordination, giving opportunity for a new one to be formed under more favorable conditions, as with correcting lenses. With this in view it may well be repeated; its aim should be, not so much exact adjustment, as to establish mechanical relations that nerve impulses will tend to carry forward to complete the cure. In Class B the object of operation is rather the direct, accurate mechanical adjustment of parts, making due allowance for the temporary effects of operation, the modifications produced by cicatrization, and the degenerative and regenerative changes that occur in the muscles.

ASSOCIATED ACTIONS OF OCULAR MUSCLES

Of the infinite number of movements of which each eye is capable, not more than six at most can be brought about by the contraction of single muscles, and only two of these, convergence and divergence in the horizontal plane, are movements frequently performed. Convergence above or below the horizontal plane, like ele-

* Read in the Section on Ophthalmology of the American Medical Association, at the Fifty-ninth Annual Session, held at Chicago, June, 1908.

vation or depression with the eyes directed forward, require the cooperation of two or more muscles.

While, theoretically, a few movements might be made by single muscles, it is not certain or probable that even these motions are thus produced. For the sake of smoothness, exactness and certainty of movement it is likely that changes of innervation occur in two or more muscles for every movement made. Conversely, each muscle takes part in the execution of many different movements, and even of movements in quite different or opposite directions. To operate on a certain muscle, to increase or diminish its effect on a single movement or group of movements, without any consideration of the effects that will be produced on other movements, is to invite disaster, or to trust to nature for a general readjustment, of muscular actions which the surgeon has never even thought of.

The direction in which the cornea is turned by contraction of a certain extraocular muscle depends on the relation of its point of insertion to the center of rotation of the eyeball. As the eye moves this direction changes, and a corresponding change occurs in the influence of the particular muscle. For instance, the superior rectus, inserted above the cornea and acting on a line passing to the nasal side of the center of rotation, when the eye is in the primary position, tends to turn the cornea upward and inward. When, however, the cornea is turned outward, so that the vertical axis lies in the same vertical plane as the line in which the superior rectus acts, this muscle turns the eye directly upward. If the eye is directed still further toward the temple, so that the line on which the superior rectus acts passes to the temporal side of the center of rotation, this same muscle tends to turn the eye up and out.

Only when the eye is in a certain position can the superior rectus act simply as an elevator. The more the eye turns inward from this position the more it becomes an adductor of the eyeball. The more it turns outward from the same position the more it becomes an abductor. The same is true of the inferior rectus, which in one position may act simply as a depressor, but in all others acts also as an adductor or abductor.

In the adduction of the eye the internal rectus takes part in all positions of the eyeball. It may be called the primary adductor. In most positions it is assisted by the superior and the inferior recti, which may be called secondary adductors. The power of the primary adductor progressively diminishes as the eye turns in and the muscle shortens. The adductive effect of the secondary adductors progressively increases as the eye turns in; that is, the power of these muscles thus becomes more and more devoted to turning the eye in.[1]

In abduction the external rectus always takes part. It is the primary abductor. The obliques assist it, but least when the eye is turned in most strongly, so that the visual axis is nearly parallel to the plane of action of the superior and inferior obliques. As the eye turns outward the obliques become more and more effective as secondary abductors, until in extreme divergence they become the more important factor in abduction.

The superior rectus may be called the primary elevator. Such it is when the eye is turned outward, the inferior oblique acting rather to produce torsion. But when the cornea is turned toward the nose the inferior oblique becomes the elevator and the superior rectus has more influence in producing torsion. If, however, the eye is turned strongly up the internus and externus come to the assistance of the primary elevator and help to turn the cornea up. Their insertions being brought above the center of rotation, they become secondary elevators.

Similarly, the inferior rectus may be called the primary depressor of the eye, its tendency being always to turn the eye down, though least effective in this way when the eye is turned strongly in, and the inferior rectus tends to produce torsion, while the superior oblique becomes a more efficient depressor. But when the eye turns down, so that the insertions of the internus and externus are below the center of rotation, these muscles become secondary depressors. The importance of their function as secondary depressors increases as the eye is turned down.

The obliques may be called the primary muscles of torsion. When the visual axis is turned to the temporal side, and level, so that it makes equal angles with the directions of the four recti muscles, torsion is entirely effected by the obliques. But in other positions the recti muscles take part in torsion; the vertical recti, as the eye turns in from this position; the lateral recti, to a less extent, as the eye is turned up or down.

SECONDARY ROTATORS IN STRABISMUS

In all cases in the execution of a particular movement the further that movement is carried the greater the share that the secondary rotators take in producing it. In strabismus the position of the deviating eye has departed from the normal. The relative importance of the primary and secondary rotators in determining its position correspondingly varies from the normal. The higher the degree of squint the greater this departure, and the greater the share of the secondary muscles in producing and maintaining the deformity.

Consider the bearing of this on particular operations. In a case of high convergent strabismus the eye is held in its abnormal position by the excessive contraction of a whole group of muscles, the internal, superior and inferior recti. Tenotomy of the internal muscle alone is but a partial tenotomy, as regards the muscles concerned. The indication is clear for extending the tenotomy to the superior and inferior tendons, and on them graduating it to the needs of the case. Without such extension tenotomy is absolutely ineffective in high convergent squint.

A superiority of advancement lies in the fact that it changes the position of the eyeball, and so lessens the power of the secondary rotators, whose influence is so large a factor in the maintenance of the squint, and renders more efficient the action of the secondary rotators that oppose the deviation. For example, in convergent strabismus advancement of the internus, actually turning the eye out, diminishes the power of the superior and inferior recti to turn it in, and increases the efficiency of the superior and inferior obliques in turning it out.

There is another difference between the actions of primary and secondary rotators, of great importance with reference to strabismus operations. The primary rotators tend to equilibrium with the eyeball in a median position. The secondary rotators tend indefinitely to increase the deviation. Thus, in convergent strabismus, the greater the squint the less the influence of the internus, and the greater the influence of the externus, tending to turn the eye to a normal position. But the greater the squint the greater the influence of the sec-

1. Trans. Section on Ophthalmology, A. M. A., 1906, p. 237.

ondary adductors in perpetuating it and increasing it, while the influence of the obliques as secondary abductors is correspondingly lessened. Tenotomy, confined to the primary adductor, the internus, lessens the relative power of that muscle, leaves convergence more a function of the secondary adductors, and, therefore, more likely to be extreme. Or, if excessive convergence is overcome, it leaves the eye with a weakened primary adductor to oppose the abductors, and, therefore, especially liable to turn out.

The primary rotators have a peculiar importance in opposing extreme movements in the opposite direction. The secondary muscles have very little value in this direction. Crippling of the primary rotators leaves the eye in a condition of unstable equilibrium, more liable to deviate under slight influences. Nor is this crippling confined to the muscle operated on. Tenotomy of the internus is followed by retraction of that muscle, but it is also followed by retraction of the externus. It is the retraction of the externus and consequent turning of the cornea outward that produces the desired correction of the convergence, for which the tenotomy of the internus is done. This shortening of the externus diminishes somewhat its power of rotating the eyeball outward. Hence, by the one operation of tenotomy done on the internus, both internus and externus have their power lessened, and the rotation of the eyeball is left more under the control of the secondary adductors, the superior and the inferior recti, and the secondary abductors, the superior and inferior obliques. The eyeball is left in the condition of unstable equilibrium, where the mutually opposing forces that tend to bring it toward a central position are weakened, and those which tend to carry it away from this position and hold it away from the central position are left relatively stronger.

LATERAL DISPLACEMENT OF TENDONS

Another principle that must come to be more generally recognized in the operative treatment of strabismus is that the effect of a muscle on the eyeball can be altered by displacing its insertion laterally. I have previously pointed out that the recti muscles, all having practically the same origin at the apex of the orbit, come to exert different influences on the eyeball through the different positions of their insertions.[2]

If it were possible to shift the insertion of one rectus to the site of the insertion of one of the others its function would be correspondingly altered. Thus, if we could attach the superior rectus to the eyeball at the nasal side, where the internus is inserted, it would have very much the effect on the ocular movements normally produced by the internus. Such complete shifting of insertion is, of course, impossible, and any shifting brings a bending of the muscle that tends rather to produce torsion. But it is practicable to shift the tendons laterally so as to cause an important change in the effects produced by the muscles acting through them.

One method of producing lateral displacement is by the extended tenotomy, which I described in 1905. This method was probably practiced and its good effects reported, without much theorizing on the subject, by some of the earlier operators for squint. Another method of securing lateral displacement I described as practiced on the superior rectus for paralysis of the superior oblique.[3]

A third method was brought to the attention of the last Heidelberg Ophthalmological Congress by Hummelsheim. He experimented first on the ape. He removed as much as possible of its internal rectus to destroy the function of that muscle. He then split the tendon of the inferior and superior recti, and transplanted the nasal half of each tendon to where the internus had been inserted. The animal was still able to execute movements of convergence and lateral movements toward the side of the excised muscle. Hummelsheim then performed a similar operation on a case of congenital abducens paralysis, in which the eye was unable to turn beyond the median line. He split the tendons of the superior and inferior recti and transplanted the temporal portions to the point of insertion of the externus. The result, reported five weeks after the operation, was an ability to abduct this eye thirty degrees beyond the median line.

At the French Ophthalmological Congress, in 1907, Dransart presented a case of injury to the superior oblique, in which by grafting its tendon on the upper part of the external rectus he obtained a good result. As to the best method of securing lateral displacement, to enable one muscle to take up the function of another, considerable experience will be required to decide. The point here emphasized is the importance of this principle in the operative treatment of strabismus and the need for its more general recognition.

The question of re-education of nerve centers, so that they can execute desired movements with unaccustomed means, is a large one. Only experience can settle the limits of possible achievement in this direction. But we know that after Motais' operation the patient can learn to close the eyes firmly, without the lifting of the upper lid, that at first occurs from contraction of the superior rectus, and tendon transplantations in other parts of the body seem to show that the possibilities of alteration in the function of muscles are quite extensive. But in the case of the superior and inferior recti we have muscles that normally aid in convergence, and probably to a slight extent in divergence, when convergence and divergence are extreme. There is every reason to expect that they can largely take up these functions in cases of disability of the lateral muscle.

EQUILIBRIUM OF LIMITED MOVEMENT

When extreme and permanent strabismus is brought about by complete loss of power in a certain group of muscles, leaving their physiologic opponents in unresisted control of the position of the eyeball, it should be possible to greatly lessen deformity, either by destroying the influence of the dominant muscles or, better, by neutralizing it through transference. Strabismus of this kind most commonly follows oculo-motor paralysis, because such paralysis acts on a whole group of muscles. Paralysis of the sixth nerve leaves the obliques still able to oppose convergence. Paralysis of the fourth nerve leaves the inferior rectus and the superior rectus and the externus to take up the different functions of the superior oblique. But oculo-motor paralysis destroys all the adductors, and leaves, unopposed, the externus and the superior oblique to turn the eye away from its normal region of fixation.

Some very good results from the operative crippling of unopposed muscles have been reported, notably by Prince.[4] But I would suggest that it may be possible

2. Trans. Section on Ophthalmology, A. M. A., 1905, p. 73.
3. Ophthal. Rev., March, 1903.
4. THE JOURNAL A. M. A., Oct. 13, 1888, also Am. Jour. Ophthalmol., September, 1902.

to so operate on the superior oblique as to make it something of a substitute for the internal rectus by a readjustment through which most of the belly of this muscle is attached to the tendon of insertion of the internus. Such an operation I have done on the cadaver. Vertical deviation can be prevented by fibrous attachments, and by adding any necessary readjustment of the external rectus it may be possible to bring about equilibrium and limited movement near the center of the field of fixation.

In cases of this kind we may be confronted with the difficulties connected with binocular vision. Where binocular vision is absent readjustment for cosmetic effect may not be very difficult. But with the liability to annoyance from binocular diplopia the difficulties of the case are enormously increased. Even here, however, re-education, with aid by blurring of the sight with lenses, may render relief possible.

SUMMARY

Let us bring together the principles underlying the operative treatment of strabismus that have been here discussed and those that have more commonly received discussion. The ocular movements are executed and controlled by nerve impulses, originated and guided by visual impressions. When these nerve impulses are faulty and can not otherwise be sufficiently modified to produce normal movements, readjustment by operative treatment may be resorted to. This readjustment may be accomplished: (1) By giving greater effect to certain impulses, advancing the insertion of a muscle; (2) by diminishing the effect of certain impulses through tenotomy, setting back the insertion of a muscle; (3) by transferring the impulses so that they will produce results different from those to which they were originally directed, lateral displacement of insertions; (4) by combining two or all of these changes.

Tenotomy allows retraction of the tenotomized muscle and also retraction of its opponent which is no longer resisted. The increase of power secured by muscular advancement may be temporary or illusory. Only modified nerve impulses are required to increase or diminish the power of any muscle. All muscle operations, temporarily suspending function, are followed by degenerative changes in the muscle substance.

Operation on a muscle should be undertaken only after careful consideration of all the movements in which it takes part, either as a primary or secondary rotator of the eyeball. The more important object in the treatment of strabismus is to bring about a muscular equilibrium. Static equilibrium so that muscular rest will leave the two eyes fixing the same point in a central position, and dynamic equilibrium, balanced movements, easy binocular fixation of greatest usefulness around this central point. A less important object is to secure movements, from this central point, of greatest range and with the least expenditure of effort. Where these objects are not attainable by increasing the power of a certain muscle or muscles they are to be sought by diminishing the power of opposing muscles or by transference of muscular power from one movement to another.

ABSTRACT OF DISCUSSION

DR. G. C. SAVAGE, Nashville, Tenn.: The law governing the ocular muscles is this:

The ocular muscles must so relate the two eyes that the two visual axes and the two horizontal retinal meridians shall always lie in the plane of the primary isogonal circle, and that the two visual axes shall intersect at some point on this circle, in the interest of both binocular single vision and correct orientation. There are just two classes of esotropia (internal strabismus), the curable, including all patients who have ever had binocular single vision, and to whom binocular single vision may be restored, and the incurable, including the many patients who have never had binocular single vision and can never be made to see singly with the two eyes. In the curable patients the crossing has occurred one or more years after birth and the crossed eye becomes amblyopic. Such patients may be cured spontaneously (though rarely) or by art, in the sense that the muscles become obedient to the law of binocular rest and motion. Later by training, the amblyopia may disappear. Operations should always be performed on sinning muscles only. There are two causes of curable esotropia, the one principal (true esophoria, without which there can be no turning in of the eye) and the other accessory (hyperopia), which because of the intimate relationship between the centers of accommodation and convergence, creates a pseudo-esophoria which, added to the true esophoria, increases the work of the externi and the basal centers controlling them, in their effort to prevent crossing. No patient should be operated on without a clear understanding on the part of the operator as to whether the esotropia is simple or complicated. If the condition is simple esotropia, the sinning muscles are the lateral recti, and only those muscles should be subjected to operations. These operations should be done with the view of giving equal tonicity to the four recti, and in the more aggravated cases all four should be operated on. In a case of hyperesotropia, the four lateral recti should be operated on; their tension should be altered but their planes of rotation should not be changed. In the most complicated esotropia—cyclo-hyperesotropia—not only must the tonicity of the muscles be altered but the plane of rotation of one muscle or, maybe, two or three, must be changed.

Whether, in these cases, the esotropia be slight or severe or medium, there is no indication for operating on the superior and inferior recti, as advocated by Dr. Jackson in his paper. Muscles whose tonicity keeps the visual axes in the plane of the primary isogonal circle should not have their tonicity interfered with by any kind of operation; and if their tonicity is not altered it necessarily follows that their planes of action can not be changed. These operations may be safe in Dr. Jackson's hands, but why adopt them when esotropia can be treated on sounder principles? General adoption of this operation, even in the more severe cases, would be attended by frequent disaster. I am sorry that my good friend advocates the punishment of muscles that have not disobeyed the law governing them, which is: The superior and inferior recti must keep the visual axes in the plane of the primary isogonal circle regardless of the point of view.

DR. A. L. DERDIGER, Chicago: I find that sometimes patients present themselves for refractive troubles, headaches or some nervous symptoms. We make an examination both for muscular insufficiency and refractive error and find as much as 3, 4, 5 degrees hyperphoria and 6 to 12 degrees esophoria or exophoria. If we are in a hurry to suggest operation in these cases without going thoroughly into the refractive error we are very liable to fall down. In the last two years I take patients that come in for headache and nervous symptoms, go over the refraction carefully a half a dozen times, and have the patient wear full correction in every instance in which there is hyperopia and astigmatism. If the patient is neurasthenic, I regulate the diet and advise as much out-door exercise as possible. The muscular trouble often disappears after proper correction of the error of refraction and careful regulation of the diet and exercise. I had a patient, a man, aged 39, cross-eyed in both eyes since childhood (convergent squint); right eye turned in more than left eye; vision in right eye, 5/200; vision in left eye, 20/60. Advancement operation was performed on the muscles of the right eye and the opposing muscles were tenotomized. The wounds healed kindly, both eyes being refracted two weeks after the operation with the following results: O. D. V. = 20/200 with + 6.00 V. = 20/60; O. S. = 20/40 with + 4.00 V. = 20/20. Full correction was prescribed to be worn constantly. The eyes being perfectly

straight, the patient can see distant objects and read fine print distinctly. The patient has been under observation for one and a half years and the eyes remain straight, vision being 10 per cent. better than at first. Another case was that of a girl aged 2½ years: V.=5/200; internal squint in both eyes, very high degree. Atropin was used for two weeks and the following correction gave perfect results: Right eye, +4.50 V.=20/20; left eye, +7.50 V.=20/20. Both eyes being perfectly straight with glasses on, I ordered full correction to be worn constantly. This case has been under observation for nearly two years and the eyes are straight with the glasses; they converge slightly without the glasses on.

DR. EDWARD JACKSON, Denver: John Fiske, in his "Myths and Myth-Makers," has written beautifully about the tendency of primitive peoples to find a spirit or indwelling force in all sorts of annoying things. When a man has been killed by a knife, in certain savage tribes, the tribesmen hold an inquest and sentence that knife. Now I think we have something of a survival of that in such phraseology as "innocent, or sinning muscle." Ideas which do not depend on any logical reasoning but are largely a suggestion of the phraseology we use are the chief obstacle to a clear general understanding of this matter of ocular movements and their correction.

TINCTURE OF STROPHANTHUS AND STROPHANTHIN *

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The pharmacology of strophanthus indicates that it has certain advantages over digitalis, and careful clinical observation has sustained the view of pharmacologists that it has a distinct field of usefulness. It is a fact, however, that the average practitioner either refuses to employ strophanthus at all, or, after a brief trial, dismisses it and returns to digitalis.

We believe that the reasons for this state of affairs can be explained satisfactorily, and that the chief causes militating against the proper use of strophanthus can be removed.

One of the principal causes of the disrepute into which strophanthus fell was the utter unreliability of the tincture because of extreme variability in the strength of the seed, according to the testimony of several German investigators. It has been shown[1] that the tincture of strophanthus made by the large manufacturing houses of the United States is surprisingly uniform in potency—much more nearly uniform than is the tincture of digitalis—but American physicians are so impressed with the weight of German opinion that it is difficult to eradicate a false impression of this nature, and particularly since our friends in Germany are still reiterating the statement that tincture of strophanthus is extraordinarily variable and unreliable, though the standardized tincture is now sold there. Inasmuch as this supposed variability does not exist here, we may dismiss that phase of the difficulty.

Another serious disadvantage common to strophanthus and digitalis has been the want of a pure soluble active principle suitable for hypodermic use. This want, at least to the extent of the pure and active principle, has been supplied in the crystallized strophanthin of Thoms.

In this connection it may be said that there is the utmost confusion in the minds of many physicians concerning the different strophanthins, and this is not surprising when even the National Standard Dispensatory gives Thoms' formula under the official strophanthin, quoting Thoms as authority. It is probable that the crystallized strophanthin is the only absolutely pure strophanthin obtainable in commerce, but the American house of the manufacturers was unable to supply this direct, but had to import it to our order. They were unable to tell us, before writing to Germany, whether the strophanthin ordinarily supplied is made by the process of Thoms. Though the official strophanthin is not an absolutely pure product, we wish to state distinctly that we do not pretend to say that it may not answer every purpose for which the crystallized strophanthin is used.

A third, and perhaps the most serious, cause of the disfavor into which strophanthus has fallen is the utter confusion concerning the dose. This naturally follows the conflicting statements regarding the toxicity of the different preparations, since the dose is sharply limited by the toxicity.

Potent remedies are almost universally recommended in minimum doses, and in strophanthin we have at once an exceedingly toxic or a comparatively mild remedy dependent on the mode of administration. Less than a milligram of crystallized strophanthin injected into a vein or subcutaneously may give rise to serious symptoms, while 150 milligrams have been given to a man by the mouth in the course of two days.

Table 1 illustrates the confusion existing regarding dosage. The figures in italics are quoted from the several authorities, the others are equivalents calculated from our comparisons of toxicity; while these equivalents are not exact, we have every reason to believe that the limits of error are very narrow. In general, 200 parts of tincture equal in toxicity one part of crystallized strophanthin, or about two parts of Merck's or Boehringer's.

Table 2 affords a comparison of the toxicity according to different investigators, and it will serve to explain the confusion regarding dosage. Digitoxin has been introduced into the table merely for the sake of comparison. It will be observed that ouabain and crystallized strophanthin, which are identical, have been found by several observers to possess the same ratio of toxicity when compared with other substances.

None of the authorities quoted has compared the toxicity of the official and the crystallized strophanthins with digitoxin on the same animal by the same mode of administration. Gley[2] found crystallized strophanthin, or ouabain (which is identical with the crystallized strophanthin) to be twice as toxic as the common strophanthin (and this agrees very well with our own results on mammals and those of Faust[3]), and eighty times as toxic as digitoxin, as determined by Koppe.

We found the toxicity of crystallized strophanthin for the guinea-pig to be about three times as great as that of digitoxin as determined by Reed and Vanderkleed.[4] Fraenkel[5] found digitoxin to be more than twice as toxic as crystallized strophanthin for the cat by sub-

* Read in the Section on Pharmacology and Therapeutics of the American Medical Association, at the Fifty-ninth Annual Session, held at Chicago, June, 1908.

1. THE JOURNAL A. M. A., 1907, xlviii, 1177.
2. Compt. rend. Acad. sc., Paris, cvii, 348.
3. Arch. Exper. Path. and Pharmacol., xlviii, 272.
4. Am. Jour. Pharm., lxxx, 110.
5. Arch. Exper. Path. and Pharmacol., li, 84.

cutaneous injection. We are compelled to reject Fraenkel's results altogether. In addition to an apparent typographical error in his article which has misled others, his conclusions do not bear scrutiny, for a careful examination of his protocols shows that the doses he used were not those stated in the conclusions. Attention is called to the fact because Fraenkel's work has been widely accepted.

Schulz[6] gives the same toxic dose for the dog and rabbit and finds no essential difference in the toxicity of crystallized and amorphous strophanthins. Both these statements are wholly at variance with the results of our numerous experiments and those just quoted.

Hochheim[7] finds, as the result of a few experiments on the rabbit, that crystallized strophanthin is "enormously toxic by vein." We have been unable to kill a rabbit with a dose nearly so small as that which he found fatal, while the dose by the stomach which we found effective is much smaller than that given by him, and whereas he found the crystallized strophanthin about 200 times as toxic by subcutaneous injection as by stomach we were able to obtain a ratio for the rabbit not very much greater than that for the cat and dog ach. Rapid absorption occurred, with destruction of only a comparatively small amount, leading to incorrect conclusions.

This want of agreement in the toxicity of strophanthin for different animals would be of much less importance were it not for the fact that these different observers have based the therapeutic dose for man on these results without regard for the conditions which modify their results.

In attempting to find a rational basis for the dosage of different preparations of strophanthus we first determined the toxicity of the tincture, and of the official and the crystallized strophanthins, for different animals by different modes of administration, for, as previously stated, the therapeutic dose must be limited by the toxicity of a given preparation by a given method of administration.

A summary of the results of a large number of experiments is given in Table 3. The most striking fact which this table suggests is the extraordinary discrepancy between the dose of the official strophanthin, on the one hand, and of the tincture and the crystallized strophanthin on the other, if we accept toxicity as a guide to

TABLE 1.—THERAPEUTIC DOSES ADVISED BY DIFFERENT AUTHORITIES EXPRESSED IN MILLIGRAMS IN ITALICS, WITH THE CALCULATED EQUIVALENTS IN ROMAN TYPE

Authority.	Crystallized Strophanthus.	U. S. P. Strophanthus.	Tincture.
U. S. P.	0.15	*0.3*	30
U. S. P.	2.5	*5.0*	*500*
National Standard Dispensary.	0.1-0.15	*0.2-0.3*	20-30
National Standard Dispensary.	1.5-5.0	3.0-10.0	*300-1000*
Mercks' Index[9]	*5x6* daily	10x6 daily	1000x6 daily
Mercks' Index.	0.1-0.5	*0.2-1.0*	20-100
Mercks' Index.	1.5-5.0	3.0-10.0	*300-1000*
Schedel[12]	*5.0-10.0x3* daily	10.0-20.0x3 daily	1000-2000x3 daily
Hochheim.	*5.0x6* daily	10.0x6 daily	1000x6 daily
Kobert[13]	*"preceding too high"*		
Fraenkel[14] (vein).	0.38-0.5	*0.75-1.0*	(unsuited)
Focke[15]	1.5x2 daily	3.0x2 daily	*300x2** daily
	2.1x1	4.2x1	*420x1*
Bellevue Hospital	3.0-5x6	6.0-10.0x6	*600-1000x6*

12. Ber. d. deutsch. pharm. Gesellsch., xiv, 120.
13. Lehrbuch der Intox., ii, 1215.
14. Arch. Exper. Path. and Pharmacol., lvii, 79.
15. Therap. d. Gegenw., 1906, viii, 348.

* Focke used 5 drops twice, or 7 drops once, a day.
Ratio of toxicity of the smallest single dose advised by mouth (0.2 mg. of the official) to the highest dose given in a day (75 mgs. of the crystallized) = 1 to 750.

under certain conditions, and only about one-eighth as great as that of Hochheim. In no case did we observe as great a degree of tolerance for strophanthin by the mouth in the rabbit as that found by Maurel[8] and Hochheim.

We shall see that the tables of toxicity for strophanthin by the mouth are of but little importance unless we know the conditions under which the poison is given.

TABLE 2.—FATAL DOSES IN MGS. PER KG.

	Cryst. Stand.	U. S. P. Stand.	Digitoxin.	Ratios.
Rabbit, st. (M'l.)	.....	40.0	....	.....
Rabbit, st. (H'm.)	18.0-30.0	....	....	.....
Rabbit, s.c. (S'z.)	0.1-0.2	(0.1-0.2)	....	1:1:—
Rabbit, s.c. (H'm.)	0.176	....	....	.....
Rabbit, s.c. (M'l.)	.....	0.4	....	.....
Rabbit, v. (M'l.)	.....	0.3	....	.....
Rabbit, v. (H'm.)	0.128	....	....	.....
Dog, st. (S'z.)	2.0	(2.0)	....	1:1:—
Dog, s.c. (S'z.)	0.1-0.2	(0.1-0.2)	....	1:1:—
Cat, s.c. (F'l)	0.2 (ther.)	....	0.08	1:—:3
G. P., s.c. (R. & V.)	.....	....	1.0	.....
—Mgs. to produce systolic standstill in frog.—				
Gley	0.013	0.025	....	2:1:—
Fraenkel	.....	0.05	0.18	—:4:1

Faust: Ouabain twice as toxic as glaber-strophanthin.
Haynes: Tincture strophanthus 40 times as toxic as tincture digitalis.

Haynes'[9] conclusions are wholly erroneous so far as the administration of strophanthus by the mouth is concerned. He used massive doses on the cat by the stomthe dose. Thus while the doses of strophanthin and of the tincture given by the U. S. P. indicate that official strophanthin is 1,600 times as active as the tincture, we find that it is only about 100 times as active when given under similar conditions.

TABLE 3.—FATAL DOSES IN MGS. PER KG. (H. & B.)

Animal.	Cryst. Stroph.	U. S. P. Stroph.	Tincture.
Cat, m't'h.	1.0-2.0	4.0-6.0	65-1000
Dog, m't'h.	1.5	4.0-5.0	?-500-1000
Rab., m't'h.	10.0	25.0	.....
Cat subcut.	0.15	0.35	40
Dog, subcut.	0.15	0.35	40
Rab., subcut.	0.35	0.8	125
Guinea-pig, subcut.	0.3	....	...
Cat, vein.	0.1	0.25	35
Dog vein	0.125	0.27	36

TINCTURE TO DOG

Tongue, 200; emesis.
Rectum, 200; def'n.
Large intestine, 30; none in 1-½ hrs.
Jejunum, 446; toxic in 55 minutes.
Ileum, 500; died in 1 hr.
Duodenum, 600; none in 1-½ hrs.
Duodenum, 1,000; died in 38 minutes.
Duodenum, 600; died in 45 minutes.
Rectum, cryst. stroph., 1 mg. per kg.; none.

The crystallized strophanthin is advised in doses from five to fifteen times as large as those of the official strophanthin, but the table seems to indicate that the amount of the official product to be given by the mouth should be twice that of the crystallized, or from ten to thirty or even fifty times that commonly advised. We can not state with sufficient emphasis that we are not prepared to advise that the dose be increased to that extent in the

6. Viertljschr. f. gerichtl. Med., xxi, 293.
7. Centralbl. f. inn. Med., xxvii, 65.
8. Soc. de biol., 1901, p. 837.
9. Bio-chem. Jour., 1906, i, 62.

present state of our want of knowledge, but we do say that the evidence shows the need of careful clinical investigation of the question.

The ratio of toxicity is fairly well maintained for the two strophanthins for different animals with different modes of administration, but it is possible that the very soluble amorphous strophanthin may, under certain conditions, show a different rate of absorption from the human alimentary canal from that shown by the lower animals and may, therefore, show an extraordinary toxicity for man when given by the mouth.

When large doses of tincture of strophanthus, or the crystallized strophanthin, are given to man by the mouth, nausea, vomiting and even bloody diarrhea ensue. This prevents the further absorption of the poison and explains why death practically never results from very large doses of these substances when they have been given in this way.

The experience of Fraenkel[10] and others indicates that the dose of the official strophanthin by vein is about one milligram. This is given at once and is not repeated within twenty-four hours. Table 3 indicates that about 0.4 mg. of crystallized strophanthin is equivalent to 1 mg. of the official drug by the vein.

Hochheim,[7] in Unverricht's clinic, advised 5 mgs. of the crystallized strophanthin as the dose by the mouth, or 30 mgs. in this way as the maximum daily dose. Kóbert thinks this dose is too high, basing his opinion on his own experiments on animals. The toxic equivalent of this dose seems to show that the single adult dose of the official strophanthin by the mouth should be about 10 mgs. and the full daily dose 50 or 60 mgs., but should this amount be absorbed quickly it would surely prove fatal. As previously stated, 150 mgs. of the crystallized drug, the equivalent of more than 300 mgs. of the official drug, have been given (by Hochheim) to a patient by the mouth in the course of two days; it caused vomiting and bloody diarrhea.

The amounts given in Table 3 are suggested as the basis of a rational clinical observation and not with any idea that it is the last word on the subject of dosage.

We believe that the strophanthins of Merck and of Boehringer & Sons and probably those of other makers are fairly uniform, but they are not absolutely pure crystalline bodies, and we are unable to vouch for them. Several samples of Merck's and Boehringer's strophanthin purchased at intervals of a year or more were examined and no difference in activity could be observed. So long as the crude drug can not be identified with certainty and is said to be the subject of gross adulteration, while the different strophanthins differ markedly in toxicity (or, what amounts to the same thing, in purity), it would seem that prudence demands that the manufacturers should standardize the non-crystalline strophanthins by a given method of standardization. For this purpose we would recommend that the amount required to kill a kg. of healthy normal cat within an hour, when a 1/10,000 solution in normal saline is injected at once into the femoral vein, should be taken as the unit and called one cat unit. This amount corresponds very nearly to 0.1 mg. of the crystallized drug.

The crystallized strophanthin obtained by the process of Thoms from *Strophanthus gratus* has a definite melting point and well defined solubilities. It is said to be soluble in 30 parts of absolute alcohol and in 100 parts of water. The following observation, which was not investigated farther, is of interest in view of the fact that an alcoholic stock solution might be ordered. One part of crystallized strophanthin dropped into alcohol formed a pasty mass which dissolved only after warming, and on standing a few days it crystallized out on the sides of the bottle. The solution made of the powdered drug was permanent. The crystals shaken with so-called absolute alcohol (about 99 per cent.) for several days did not dissolve in the proportion of 1 to 100.

It would not be profitable to discuss all of our experiments in detail, but certain significant results will be considered. The cat and dog show a nearly identical degree of susceptibility, the latter being a trifle more resistant. Both of these animals vomit with such uniformity so soon as a toxic dose of strophanthin enters the circulation that it is difficult to fix the fatal dose by the mouth with any degree of precision.

In order to obviate this difficulty the effort was made to depress the vomiting center by a small dose of the tincture which was followed by a larger amount. This was wholly unsuccessful, as the animals promptly vomited as soon as a toxic dose had passed into the circulation. Morphin was then employed to depress the vomiting center of another dog, and the dose of strophanthus which would produce only vomiting under normal conditions then promptly caused death. The importance of this in therapeutics under certain conditions is obvious. In this way it was found that the single fatal dose of the tincture for the dog by mouth is about 600 to 1,000 mgs. per kg., when the tincture is well diluted with water.

A form of dilution favorable for quick absorption was then tried; the concentrated tincture or alcoholic solution of strophanthin was washed down in a little alcohol, and in this way we were able to kill or severely poison several animals with doses but little above those required by subcutaneous injection and very much less than those usually required to cause death after oral administration.

Sixty-six milligrams of the tincture per kg. proved fatal to Cat M when given in this way. A proportionate amount may be taken in the course of a day by a man in the usual way and give rise to no symptoms whatever. The cat used in this experiment was somewhat emaciated and the result was not considered wholly satisfactory on that account, but prompt emesis followed this dose given in the same way to Cats 3 and 4, and emesis occurred repeatedly in Cat 4. This shows that the amount absorbed was not very far from the fatal dose and might well have proved fatal had emesis not followed. Furthermore, it may be stated in support of the result with Cat M that a sick rabbit was repeatedly injected with large doses of strophanthus and only succumbed to a dose which would prove fatal to a normal rabbit.

EXPERIMENT 1.—March 24, 1908: Cat M., male, weight 1.1 kg., has been the subject of a number of experiments and is very much emaciated. Had been used for strophanthus one week previously. 3:15 p. m.: 0.066 c.c. tincture strophanthus per kg., diluted with a little alcohol, washed down with 1 c.c. alcohol, 5:45 p. m.: Cat lies down, but is able to get about.

March 25: Cat found dead.

The rabbit is somewhat more tolerant than the cat or dog when the drug is injected subcutaneously, and very much more so when it is given by the mouth. The white rat is extraordinarily tolerant whether the poison be given by the mouth or subcutaneously; thus the equiv-

10. Arch. Exper. Path. and Pharmacol., lvii, p. 79.

alent of 70 mgs. per kg. of crystallized strophanthin was injected subcutaneously in one case without producing any perceptible effect, while another white rat weighing only 156 gms. ate 100 mgs. with his food without ill effects.

Disintoxication appears to be more rapid in the case of the rodents than with the cat and dog, for the rat was seen to return to the poisoned food after brief periods of depression, and the rabbits ate with avidity in a few hours after a nearly fatal dose by subcutaneous injection, while the effects of large doses were observable for several days in the cat and dog.

The difference in toxicity seen after slow and rapid absorption seemed to support the explanation of von den Velden[11] that the lesser toxicity of the digitalis bodies by the mouth is due to a slower absorption. That this does not suffice to explain the differences seen with strophanthin is shown by the results of experiments 2, 3, 4 and 5. In experiments 2 and 3 a very dilute solution of the crystallized strophanthin (1:250,000) was slowly injected into the femoral vein; although free diuresis resulted from the injection of such a large amount of normal saline, the fatal dose of strophanthin was but little more than that which the animal survived for more than two hours in experiment 4, in which the solution, 1:10,000, was injected at once into the vein, and the single dose given in experiment 2 was the same as that which proved fatal with slow injection in experiment 4, but this is explained in part by the excess of fat.

If by "slower absorption" von den Velden would have us understand the failure to absorb the greater portion of a dose during its passage of the entire small intestine, then his explanation must be accepted as probably correct. This is failure to absorb, rather slow absorption, in the usual acceptation of the expression.

EXPERIMENT 2.—April 18, 1908: Dog 4, male mongrel, weight 14.85 kg., excessively fat.

10 a. m.: 0.01 gm. morphin sulphate per kg. subcutaneously.

10:15 a. m.: Light ether anesthesia. Cannula into femoral vein.

10:18 a. m.: Ether withdrawn.

10:42 a. m. to 12:05 p. m.: 1/800 mg. per kg. per minute of crystallized strophanthin in normal saline (1:250,000) injected into vein.

12:05 p. m.: Injection stopped, and dog died in about fifteen minutes.

Total dose: 1.58 mg. or 0.105 mg. per kg.

Total normal saline: 400 c.c. or 27 c.c. per kg.

EXPERIMENT 3.—April 18, 1908: Dog 5, male, good condition, weight 7.4 kg.

2:05 p. m.: 0.01 gm. morphin per kg.

2:15: Ether, light anesthesia. Cannula into femoral vein.

2:30 to 5:13 p. m.: Injection as in Experiment 2 till death of animal.

Total dose: 1.3 mg. or 0.175 mg. per kg. crystallized strophanthin.

Total normal saline: 325 c.c. or 44 c.c. per kg.

Time of injection: 2 hours 43 minutes.

EXPERIMENT 4.—April 20, 1908: Dog 6, fox terrier, fine condition, weight 8.5 kg.

1:10 p. m.: 0.01 morphin sulphate per kg. subcutaneously. Ether as in Experiment 2. Cannula into femoral vein.

1:38 p. m.: 0.1 mg. crystallized strophanthin per kg. into vein.

3:48 p. m.: 0.025 mg. per kg. as before.

4:01 p. m.: Animal died.

Total dose: 0.125 mg. per kg. in 10,000 parts normal saline.

EXPERIMENT 5.—April 24, 1908: Dog 8, female, mongrel, weight 7.65 kg.

11:25 a. m.: 0.01 gm. morphin sulphate subcutaneously. Ether for light anesthesia. Cannula into femoral vein.

12:07 to 12:42 p. m.: 100 c.c. (1:100,000) strophanthin (1 mg.).

12:57 to 1:07: 10 c.c. (1:100,000) strophanthin (1/10 mg.).

1:22 to 1:29 p. m.: 10 c.c. (1:100,000 strophanthin, (1/10 mg.).

1:44 to 1:49 p. m.: 5 c.c. (1:100,000) strophanthin (1/20 mg.).

2:14 to 3:10 p. m.: 58 c.c. (1:100,000) strophanthin (58/100 mg.).

3:14 to 3:25 p. m.: 18 c.c. (1:100,000) strophanthin (18/100 mg.).

4 to 4:49 p. m.: 45 c.c. (1:100,000) strophanthin (45/100 mg.).

4:49 p. m.: Dog died.

Total duration of injection: 4 hours 42 minutes.

Total dose: 246 c.c., 2.46 mg. strophanthin.

Dose per kg.: + 2.46 — 7.65 = 0.322 mg.

This method always gives results somewhat too high, and if 20 per cent. of the lethal dose is destroyed in the time of the experiment it gives 0.27 mg. per kg. This is almost the exact fatal dose by vein when given at once.

This is also shown in the case of the official strophanthin. In experiment 5 a dog received 0.322 mg. of official strophanthin by the vein in the course of nearly five hours. Since the animal organism is capable of destroying almost the full lethal dose in twenty-four hours, we should expect the effective dose in this case to be at least 20 per cent. higher than when the injection is made at once. This would indicate that 0.27 mg. is the fatal dose of strophanthin by the vein for the dog. This is almost precisely the effective dose when given at once by the vein.

Curarin and antiarin are said to be destroyed in the liver, and this source of destruction of strophanthin, of course, presented itself to our minds. That the liver does not destroy strophanthin in amounts sufficient to account for the lessened toxicity by the mouth is shown by comparing the results of experiments 3 and 6. A dilute solution is just as toxic when injected slowly into the splenic vein as when it is injected into the femoral. In fact, the animal which received the injection into the splenic vein succumbed to a slightly smaller dose, but the difference lies wholly within the limits of ordinary variation.

EXPERIMENT 6.—Female fox terrier, quite fat, weight 10.35 kg.

10:25 a. m.: 0.01 gm. morphin sulphate per kg. subcutaneously.

10:45 a. m.: Light ether anesthesia. Cannulas into carotid artery and splenic vein.

11:34 a. m. to 1:54 p. m.: Injection as in Experiment 3 of crystallized strophanthin, 1 to 250,000 normal saline.

1:57 p. m.: Animal died.

Total dose: 1.52 mg. or 0.147 mg. per kg.

Time of injection: 2 hours 29 minutes.

Peptic and activated pancreatic digestants, as well as bile, were found to exert only an unimportant influence on the toxicity.

When a large dose of strophanthin was injected directly into the duodenum an amount equal to ten times the fatal dose by vein disappeared from the lumen of the small intestine in the course of an hour and a half without causing toxic symptoms in the dog, while the solution remaining unabsorbed in the small intestine retained its toxicity, as shown by injecting it into a cat subcutaneously. The cat promptly died with typical symptoms.

11. München. med. Wchnschr., lili, 2137.

From this it appears probable that strophanthin is destroyed in part in the intestinal canal when the drug is taken by the mouth, but that rapid absorption may take place is shown by the results of experiments already quoted, and by one in which a large amount was introduced directly into the duodenum and death with typical symptoms followed in thirty-eight minutes.

While one of us (R. A. H.) has concerned himself chiefly with the questions of dosage and the factors which modify this with different methods of administration, the other (H. C. B.) has made a number of clinical observations on patients in Bellevue Hospital. The results of these observations will be the subject of a subsequent communication, but the point to which we now wish to draw attention is the subcutaneous injection of strophanthin.

Dr. Bailey employed the official strophanthin, dissolved in sterile salt solution, in one case, but for the most part the crystallized strophanthin was used. This was dissolved in 4,000 parts of salt solution, which was then sterilized by boiling, and the appropriate dose—0.3 to 0.5 mg.—was put into sterile serum tubes and the latter sealed in the flame. This solution was injected deeply into the gluteal muscle once in twenty-four hours. It gave rise to a slight degree of pain lasting about an hour, which was never sufficient to prove a serious objection to its use in this way. No side actions, such as described by Fraenkel, were seen in any case. The action was more prompt than could be elicited by 1 c.c. of the tincture given by the mouth every four hours—6 c.c. in the twenty-four hours.

CONCLUSIONS

The dosage and the proper mode of exhibiting strophanthus and strophanthin require clinical investigation. The action of strophanthin may be elicited promptly in suitable cases by injecting it subcutaneously. Three-tenths to half a milligram of the crystallized strophanthin in sterile (boiled) salt solution, 1/4000, may be injected deeply into the gluteal muscle once in twenty-four hours without fear of abscess formation or other side actions.

The single adult dose of crystallized strophanthin by the mouth is about 5 mgs. or less, the daily dose 30 mgs. or less. The single adult dose of the official strophanthin by the mouth is probably about 10 mgs., and the daily adult dose by the mouth is probably about 60 mgs., but the latter dose should not be used until we have further clinical experience concerning the various factors governing its absorption.

The action of tincture of strophanthus by the mouth and the factors modifying its absorption require further clinical study. Uniformity of action can only be secured by uniform absorption, and this is influenced by the menstruum in which the drug is given and the condition of the alimentary canal at the time of administration.

It is quite possible that diet may influence the absorption of strophanthin in the human alimentary canal, so that man may at one time resemble the rodent and at another time the carnivorous animals (cat and dog) in susceptibility to strophanthin.

ABSTRACT OF DISCUSSION

DR. TORALD SOLLMANN, Cleveland, Ohio: This paper explains why strophanthus has not received the popularity to which one might suppose it entitled. I think that clinicians have been extraordinarily wise in not relying on a drug about which so little is really known. Yet strophanthus contains great capacities for good and it is to be hoped that investigations such as Dr. Hatcher's will be carried still further. These investigations tend to substitute definite for indefinite knowledge. The dose now varies anywhere from 1 to 1,000. I believe that if these investigations are continued, strophanthus will prove to be a very important drug.

DR. C. W. EDMUNDS, Ann Arbor, Mich.: The report of the uniformity of strophanthus tinctures did not agree with the results I obtained last year. I found that strophanthus tinctures varied exactly the same amount that the tinctures of digitalis varied; that is, the fatal dose in one preparation was 0.0012 of a cubic centimeter, in another 0.0025, in another 0.005, in other words a ratio of 1 to 4. In regard to the difference in toxicity between tincture of digitalis and strophanthus, the results I obtained with tincture of strophanthus, taking the average of all the preparations studied, showed that strophanthus was about sixty-seven times as toxic as digitalis, which agreed fairly well with Haynes' results. He compared 2.5 per cent. tincture of the British Pharmacopeia with a 12.5 per cent. digitalis tincture. I forget his exact figures, but I think he found a ratio in toxicity of about 12 to 1, which, multiplied by 5 on account of the difference in strengths of the two tinctures, would make his figures agree pretty closely with mine.

MR. M. I. WILBERT, Philadelphia: The figures mentioned by Dr. Edmunds a few moments ago are further emphasized by the suggestions of Dr. Hatcher on the variability of the sources of strophanthus. The drug strophanthus has been before the medical public for upward of forty years, and has received ample recognition in the voluminous literature that has been published since 1873, when Dr. Frazer read his first paper on this drug. It is evident that the majority of medical men do not feel safe in using strophanthus. This feeling of uncertainty, evidenced by the fluctuating use of strophanthus, is, no doubt, largely due to the irregularity in the source of the seed. The Pharmacopeia gives *Strophanthus kombé* as the only source of drug from which the official tincture of strophanthus can be made. As a matter of fact, *Strophanthus kombé* was, for a number of years, practically out of the market. The annual reports of European drug houses have repeatedly called attention to the fact that the supply of *Strophanthus kombé* was meager and that the available drug was frequently mixed with other, more or less inert, seeds. In a recent paper by Professor Gilg, read before the Pharmaceutical Society in Germany, he suggests that *Strophanthus hispidus* be made the official source. *Strophanthus hispidus* is cultivated in a number of places in South Africa, is readily controlled and always comes into the market of uniform quality. We have reason to believe that *Strophanthus gratus* is the source of crystalline strophanthin, which, as Dr. Hatcher has pointed out, is identical with ouabain, a glucosidal substance obtained from the wood of a species of Acocanthaceæ, and is at least twice as strong as the official strophanthin. Here is a possible complication that should be guarded against. I think it would be unfortunate indeed if *Strophanthus gratus* should be generally confounded with the official strophanthus. In addition to this complication with the seed we may also have the same complication in connection with the active principles. At the international conference held in Brussels in 1902 for the unification of the formulas for potent medicaments, the delegates present were so uncertain about the origin of strophanthus that the committee did not include the origin or the description of the seed in the final protocol, despite the fact that it did include the tincture. The proposed international tincture of strophanthus differs from the U. S. P. tincture in the strength of alcohol to be used in the percolation of the drug and that is another point which may be of importance. The international tincture is more readily made, the drug is more thoroughly exhausted, and the finished preparation stands up better and remains clearer longer than the corresponding U. S. P. preparation. The international menstruum represents 75 per cent. alcohol, while the menstruum directed in the United States Pharmacopeia represents about 65 per cent. of alcohol.

DR. E. M. HOUGHTON, Detroit: I am particularly glad to note that Dr. Hatcher's statements relative to the toxicity of strophanthus coincide almost exactly with those I made in a paper before this section ("The Pharmacologic Assay of the Heart Tonics," THE JOURNAL, Oct. 22, 1898), I think exactly ten years ago. I pointed out that the toxic dose of the strophanthins on the market varied from 1 to 90; in other words I found with different samples of strophanthin obtained in this country and Europe one strophanthin ninety times as strong as another. At the same time I called attention to the variability in the activity of tincture of strophanthus and preparations of digitalis, and proposed a method of determining the activity of the heart tonics and especially of the tincture of strophanthus. I used as a standard 0.00015 c.c. tincture of strophanthus per gram body weight of frog as the minimum fatal dose when injected into the abdominal lymph sac.

Since then it has been my privilege to examine or have examined hundreds of samples of tincture of strophanthus, and I have adhered to that standard. I have in course of preparation just now a paper on the heart tonics, in which I shall enter more fully into the question of standards for digitalis and strophanthus. I have found the tincture of strophanthus prepared according to the seventh revision of the U. S. P. approximately ten times as active as the corresponding fluidextract of digitalis. In other words, the standard I have adopted for 5 per cent. tincture of strophanthus, 0.00015 c.c. per gram body weight of frog, is exactly one-tenth that for fluidextract of digitalis (0.0015 c.c.), when similarly injected.

Examination of these figures shows that strophanthus is two hundred times as active as digitalis, in terms of crude drug. It seems to me from the very large number of samples examined of different preparations of these two drugs that the figures just cited as standards for their strength are reasonable as representing the activity of average samples of first-class drug.

DR. ROBERT A. HATCHER, New York: The difference in toxicity of strophanthus and digitalis is largely based on the length of time required. It is well known that digitoxin reacts slowly. It will probably take two hundred times as much digitoxin as of strophanthin to kill in an hour, but if you take the minimum fatal dose, regardless of time, the difference is much less. Fraenkel found that the minimum fatal dose of digitoxin did not kill within eight days (cat). An enormous dose is required to kill within an hour, whereas ouabain is quickly fatal in minimum fatal doses. That is probably why Hedbom, experimenting on frogs, found ouabain eighty times as toxic as digitoxin. As to variability of the tincture, I do not deny that it may exist, but there is no excuse for any one's failure to obtain reliable preparations, and we can obtain reliable preparations of strophanthus without limiting ourselves to those of one manufacturer. I compared the tincture made by Burroughs, Wellcome & Co. with those of Parke, Davis & Co. and Squibb, and with those made from seed obtained from Gilpin, Langdon & Co. and one from a specimen of seed that had been in our laboratory for nearly twenty years, and all were found to be of practically the same strength. Samples were purchased of the east side drug stores in New York and the better class of stores were purposely avoided. There is no reason why the crystalline strophanthin should be confused with the official, but the difference in toxicity has not been sufficiently emphasized. Ouabain is the most toxic; strophanthin, which is methyl ouabain, is about one-half as toxic, and acocantherin, which is dimethyl ouabain, is about one-fourth as toxic; this is very suggestive as to the effect of methyl groups on the toxicity. There is absolutely no reason why crystalline strophanthin should not be prescribed. I believe that Dr. Edmunds must have used much larger doses of digitoxin than the minimum fatal. There is certainly no such difference in the toxicity of strophanthus and digitalis as suggested, for no one could use 3,000 (50 × 60) minims of tincture of digitalis daily without effect. Haynes states that strophanthus given by the mouth is fifty times as toxic as is digitalis, but that is absolutely untrue, at least under ordinary conditions.

DEPARTMENTS OF HYGIENE UNDER BOARDS OF EDUCATION *

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In the modern scientific business life the technical business expert has a permanent place. The erection of a city structure involves the cooperation of engineering and architectural experts as never before. Electric and mining work involves groups of experts, each connected with some special phase of the subject. School boards have had new problems thrust on them, and the employment of business agents and building experts has become indispensable. It is my belief that the group of problems centering about the health of school children demands technical treatment as highly specialized as that required for other departments. A few statements of fact will bring out the necessity of the measure here advocated.

On good eyesight depends to a large degree one's ability to conduct successfully the affairs of life. Notwithstanding the great damage or degeneration that the vision of American school children is constantly undergoing, there is hardly a school board in America that has in its employ a technical expert to decide on questions relating to eyesight. School-books are adopted, but no standards have been established based on adequate research as to the length of lines for the various ages, size of type, size and stroke of letter in connection with the lines, the width of the margins, the use of halftones as compared with outline drawings, the use of dead-finished as compared with coated paper, and similar questions. There are authorities on many of these matters, but we have no experts in the employ of departments of education who can speak authoritatively from the standpoint of special study made of these conditions as they exist in American schools.

This extraordinary condition with reference to the problem of vision does not stand alone. Through the school we have changed the life of the child from one of predominant activity to one predominantly sedentary in character. During five hours of the school day for ten months in the year children are obliged to be seated for the major portion of the time. So extensive a readjustment of the life habits of the young of a species has never before taken place. Its effects on digestion, circulation, nutrition and posture are as yet unknown. Yet there is not employed by any board of education in America one expert to make a special study of this group of problems centering about the changed conditions of life as they exist under the conduct of the modern school.

The returns from examinations made by competent physicians in all parts of America indicate that there are many children in all parts of America whose school progress is hindered and whose prospects in life are lessened by hypertrophied tonsils and adenoids; and yet up to the present time there is not employed by a department of education in America a technical expert to study the reasons for the occurrence of such growths, particularly as related to school life, or the means of prevention. The only thing that is being done is to attempt to operate on the tonsils and adenoids after they have grown.

* A paper prepared for the Section on Hygiene and Sanitary Science of the American Medical Association, Chicago Session, 1908, but not read.

We know that growth is more fundamental than education; that when educational demands are too severe, growth is interfered with; yet there is not a school in America that systematically weighs and measures its children to ascertain whether or not they are growing normally, and then readjusts the school tasks to fit this fundamental physiologic condition.

We know that nervous diseases among children are increasing. We believe that these disorders are related to the increased tension on the children. Many believe that this is due in part to the tasks imposed by school life, and yet there is not a board of education in America that is employing an expert to ascertain the facts with reference to these problems.

The fatigue of overwork, the fatigue resulting from home study—these we all recognize to be serious clogs on development; and yet our courses of study all over America are constructed without the guidance of experts whose authority is based on investigation of these matters.

These are some of the facts which lead us to believe in the employment by departments of education of technical experts who shall work on these problems—experts who shall have power with reference to these matters, just as other experts in the employ of the departments of education have power with reference to their special lines. School buildings are not erected without the direction of expert architects. The recognition of the technical expert in medical lines is just as necessary as it is in architectural lines. It is not sufficient to secure the best available authority on these subjects. No oculist, no group of oculists at the present time possesses the information needed to answer the questions that arise in connection with the vision of school children under school conditions. It is a specialty within a specialty. We do not need authority; we need evidence. And then we need power within departments of education to see that the fundamental condition of successful human life, namely, health, is properly conserved. To this end there should be organized under every board of education a department of school hygiene having adequate financial support and administrative power.

It may be safely affirmed that until this is done, until the school itself attacks these problems with the implements of science, no contribution of permanent value to physical development will be made in the field of education. Obviously the detection of contagious disease in the schools, involving daily visits and the power of the law to act, belongs in the nature of the case to the board of health. Quite as obviously also the care of ventilation, recesses, lighting, seating, exercise, hours for home study, must rest with the board of education. In other words, where the object is the protection of the community the board of health is responsible, and where steps necessary to the proper education of the individual are concerned the board of education is responsible. If these propositions are true they leave but one division of the topic open to discussion, namely: who should conduct the examination of school children for defects likely to interfere with proper growth and education, such as adenoids, defective eyesight and hearing?

Whoever does this work, it is further obvious that such records must follow the child from grade to grade and also from school to school; that they must be considered by the grade teachers, and, most important of all, that each case must be consistently followed up, so that, as far as possible, such disabilities may be removed; that is, they are an important part of the school records and must be so made and organized as to be available to the school authorities. So the board of education must at least be one of the active parties in such medical examination.

1 Madison Ave.

THE CAUSES AND THE TREATMENT OF BACKACHE IN WOMEN

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Backaches in women are so common and so far-reaching in their effects that a thorough understanding of them is of the greatest importance to members of the medical profession, to say nothing of their patients. A much too large number of women are its victims. Much of the hysteria and neurasthenia from which they suffer appears to be caused by the nervous leak due to the constant backache, much in the same way that eyestrain gives rise to headaches and other nervous disorders. Yet, if we turn to our text-books, we find practically nothing on the subject.

CAUSES

First, we must determine the cause of the backache. The causes of backache below the dorsal region are numerous, and it is essential for success in its treatment that its origin be accurately diagnosed. The causes are rheumatism, strains, neuralgia, sacroiliac disease, caries of spine, fracture of spine (especially of the coccyx), hemorrhoids or other rectal disease, pendulous abdomen, disease of any of the internal pelvic organs and cellulitis of the uterosacral ligaments.[1]

It is especially with the last two that this paper has to deal.

As a matter of fact the question commonly arising is whether the cause of the backache is pelvic disease, or if it is a strain or rheumatism. The backache of rheumatism and strains are usually seated in the lumbar muscles; and in the former, the pain often radiates down the sciatic nerve. In rheumatism and strain the backache is increased by bending forward so as to put the lumbar muscles on the stretch. This has no effect on the pelvic forms of backache.

Pelvic backache is of two kinds. In one there is pain and tenderness at the fourth and fifth lumbar vertebræ, where the spinal nerve center governing the internal pelvic organs is situated. This pain and tenderness may be due to any painful disease of the internal genitals, and is simply a protest on the part of the center against being constantly irritated. The treatment of this form, to be permanently efficacious, necessitates the cure of the underlying disease.

In the second variety there is a tender spot on either side of the second sacral vertebra, which, it is my contention, is due to cellulitis of the uterosacral ligaments. I shall state my grounds for this theory later.

There are two diseases that might be mistaken for the pelvic forms of backache if only the site of the pain were considered. One is incipient sacroiliac disease; this gives rise to pain and tenderness at the sacroiliac joint, but it is rarely bilateral, and concussion of the iliac bone

1. Besides these conditions, Satterthwaite, of Boston, describes conditions of softening of the sacroiliac cartilages occurring at the menstrual period, analogous to that which occurs during pregnancy, also strains and subluxations of these joints.

gives rise to pain. The other is caries of the fourth or fifth lumbar vertebra. This, however, is accompanied by some spinal rigidity, and a jar, such as is caused by having the patient jump, greatly aggravates the pain.

Neuralgia is not so sharply localized, and gives rise to a more intense, usually intermittent pain, instead of a dull, constant ache. In rectal inflammations and fracture of the coccyx the pain is referred to the coccyx. In pendulous abdomen, often associated with general enteroptosis, there is a dull, constant dragging pain referred to the lumbar region; probably due to the traction of the mesentery on the spine. This variety is temporarily relieved by causing the patient to lie down, and permanently by wearing an abdominal supporter.

BACKACHE DUE TO CELLULITIS OF THE UTERO-SACRAL LIGAMENTS

The sole variety of backache that is found only in women is that due to cellulitis of the uterosacral ligaments; as that due to irritation of the spinal center is duplicated in the male in prostatic and other genito-urinary troubles.

Having eliminated the causes of backache common to either sex, we next, by vaginal examination, endeavor to determine which organ is at fault.

To determine which organs give rise to backache, I examined a number of women with this symptom. I find that pressure on an inflamed ovary gives rise to pain and a sickish feeling; the pain is not referred to the back. Pressure on the inflamed uterus likewise gives pain, but not in the back. Pressure over the inflamed uterosacral ligaments, however, gives rise to severe pain in the back at the outer sides of the second sacral vertebra. Pulling the uterus forward, thus putting the ligaments on the stretch, also gives rise to the pain. Now, the fact that the uterosacral ligaments are attached to the sides of the second sacral vertebra seems to make a complete and damaging case against these offenders.

The uterosacral ligaments have been described under several names, but the descriptions are usually inadequate. They have been known as the retractor muscles of the uterus; and, with their peritoneal covering, as the sacrouterine ligaments. They have been described as folds of peritoneum, and as muscles. Briefly, they consist of muscle tissue which is in direct continuity with that of the uterus, together with connective tissue, blood vessels and nerves. They arise from the posterior wall of the uterus at the level of the internal os, and diverge outward and backward on each side of the rectum and are inserted on the sides of the second sacral vertebra. They are partly covered with peritoneum which is in direct continuity with that covering the uterus, and which merges into the peritoneal coat of the upper part of the rectum, and is known as the uterorectal ligaments. These form the posterior and lateral borders of the cul-de-sac of Douglas.

These ligaments may be the seat of an acute or chronic inflammation. In acute cellulitis they are much thickened, because of the enlarged blood vessels, exuded serum, etc., as in all inflammatory conditions of cellular tissue. This may end in resolution, in suppuration, or may become chronic. The chronic variety is of two kinds. In the first the ligaments may be as thick as a finger on account of hyperplasia of the tissue elements. In the second the ligaments are barely thickened, but much shortened, drawing the uterus close to the sacrum.

Inflammation of the uterosacral ligaments is known as parametritis posterior, and as cellulitis of the uterosacral ligaments. For the four varieties I have described I will suggest the following names:

1. Acute cellulitis of the uterosacral ligaments.
2. Acute suppurative cellulitis.
3. Chronic hypertrophic cellulitis.
4. Chronic atrophic cellulitis.

As above described, these forms may run into one another, being but stages of the disease. Thus the chronic hypertrophic may by cicatricial contraction result in the atrophic.

The causes of the acute forms are pelvic infection of any kind. They are rarely independent diseases, but are associated with cellulitis of the broad ligaments, etc. I shall not describe this disease in detail, as it is well known.

The chronic forms may follow the acute, or may come on gradually from slight septic absorption from the uterus; for instance, from an old laceration, or erosion, or gonorrhea, or following childbirth. The uterosacral ligaments may also become inflamed as part of a pelvic peritonitis or extension of inflammation from a diseased ovary which is adherent to them. It is this chronic cellulitis of the uterosacral ligaments that gives rise to the interminable backaches which usually are so little benefited.

VARIETIES AND TREATMENT

The common treatment they receive in our large hospitals is a curetting for the endometritis which so often accompanies this condition, and the patient leaves little, if at all, benefited, so far as the backache is concerned.

The symptoms in an uncomplicated case are backache referred to the two spots described, which becomes worse on exertion, especially sweeping. There is a distressing sense of weakness. Sexual intercourse is often painful, on account of pressure on the inflamed ligaments, and so leads to incomplete intercourse, and frequently to repugnance to it, thus indirectly again becoming a factor in the neuroses of women.

The diagnosis by vaginal examination is easy if a few facts are borne in mind, viz.: The normal uterosacral ligaments are felt as thin bands at the sides of the cul-de-sac of Douglas and can be made much more prominent by pulling the cervical portion toward the pubic bone. Pressure on them is painless. Normally, the ligaments are so elastic that the uterus can be brought forward bimanually until arrested by the pubic bone. This again is painless.

In acute cellulitis a considerable exudate forms rapidly in one or, more frequently, both ligaments. The ligament feels hard and is very tender. Any attempt to move the uterus forward gives rise to acute pain, especially in the back. There is usually fever, varying in intensity with the virulence of the inflammation.

If the mass suppurates, the fever rises, and chills are apt to occur. The mass now feels more boggy, a soft spot being present with harder surroundings. Fluctuation is rare, being present only if the suppurating focus is very large, or when it is pointing in the vagina.

In hypertrophic cellulitis the ligaments feel thickened, sometimes to the size of a finger, and are inelastic. Pressure or traction on them gives rise to the characteristic backache.

In the atrophic variety the shortened ligaments, dragging on the uterus at the level of the internal os, bring

this portion close to the sacrum and thus often produce an anteflexion. The shortened ligaments interfere with the mobility of the uterus in all directions, and attempts to move it give rise to backache.

The treatment of acute cellulitis is to put the patient to bed, apply an ice-bag to the lower abdomen and administer active saline cathartics. Locally, tampons dipped in 5 per cent. iodin-glycerin are useful, and hot vaginal douches may be given, although I think their usefulness has been overrated. Besides this, the cause if still present must be removed. If suppuration occurs, or before in a severe case, the mass should be incised by vagina and drained, care being taken not to enter the peritoneal cavity.

In mild cases of the chronic variety painting of the posterior vaginal fornix with tincture of iodin two to three times a week, also 5 per cent. ichthyol-glycerin tampons, or vaginal suppositories inserted at night are useful. If by this means we do not get sufficient absorption, pelvic massage may be added. This is applied in two ways: First, by stretching the ligaments gently by bimanual traction of the uterus toward the pubis, never using force enough to give much pain; and, second, by pressure against the ligament with the first and second finger of the left hand in the vagina; the right hand depressing the abdominal wall until the ligament can be pressed on from above. Small rotary movements with the right hand are now made for five to ten minutes. The object of this is to promote absorption, and to lengthen the ligaments. This method produces fairly good results, but rarely removes the backache completely; and must be persevered in for several months. Besides it is somewhat painful.

To overcome these objections it occurred to me that section of the uterosacral ligaments would be a rational treatment, and one fraught with little danger.

REPORT OF CASES

I report in detail two cases, one in which the operation was performed by vagina, and the second by laparotomy:

CASE 1.—Last summer a young woman came to me from Boston, and, as hers was an extremely bad case, I used this method on her.

Patient.—Miss G. was 25 years old, anemic and somewhat slight, a semi-invalid on account of severe backache with neurasthenia. She could walk only from three to four blocks before becoming exhausted.

History.—The patient stated that her illness was of seven years' duration. No definite etiologic factors could be elicited. During this period she had had extreme backache and general weakness. She had been put to bed and treated for long periods by homeopathic, osteopathic, mental science and regular practitioners, but with only transitory amelioration of her symptoms.

Examination.—Vaginal examination revealed an anteflexion with some enlargement of the uterus. Ovaries and tubes were normal. The uterosacral ligaments were shortened, inelastic and about the thickness of a lead pencil. The ligaments were very tender to the touch and pressure on them gave rise to the characteristic backache each side of the second sacral vertebra.

Diagnosis.—The diagnosis was anteflexion, chronic metritis, and chronic uterosacral cellulitis in a transitional stage from the hypertrophic to the atrophic variety.

Operation.—I sent the patient to St. Mark's Hospital and had her prepared for operation. The uterus was dilated and curetted. A transverse section extending through the vaginal wall was then made in the posterior vaginal fornix, close to the uterus, about two inches in length. The cellular tissue was separated by the fingers and the cul-de-sac of Douglas opened. The ovaries were palpated and a few fine adhesions to the right one severed. Next, a Polk's handled needle was threaded with No. 3 catgut, and a ligature thrown around the right uterosacral ligament close to the uterus. A second ligature was inserted more posteriorly, and the ligament cut between with a pair of scissors. The same procedure was followed on the opposite side, and the vaginal incision sutured. The insertion of a perforated stem-pessary into the uterus completed the operation.

Postoperative History.—For three days after the operation there was considerable backache which afterward disappeared. Two weeks after the operation the patient left the hospital. I kept her under observation for two weeks more, during which time she took walks miles in length and avowed she had no pain whatever. I am informed by letter that the patient at this time continues to be free from backache, has gained in weight, and is strong and healthy.

CASE 2.—*Patient.*—Mrs. W. had suffered for years with severe backaches of both varieties, headaches and dysmenorrhea often confining her to bed.

Operation.—I performed a laparotomy, enucleated about a half dozen fibroids from the uterus, removed the right ovary, which was cystic, severed the uterosacral ligaments and performed a ventral suspension.

Postoperative History.—Recovery was uneventful, and the patient's condition is now excellent.

ANSWER TO POSSIBLE OBJECTION

The objection to the operation might be made that the uterosacral ligaments are an important support of the uterus, and that severing them might lead to prolapse of that organ; but the peritoneum holds the divided ends of the ligament from dropping too far apart, and the gap must eventually be filled by a nerveless fibrous tissue. The final result will be the same as in the section of a tendon of the eye for strabismus, namely, the tendon becomes longer. Backaches in women are so common and distressing in result that it is the duty of the physician to do all in his power to relieve them. The operation which I shall call section of the uterosacral ligaments should be safe in skilled hands, and if on further trial it gives anything like the relief it did in the cases cited it should be used to combat pain and disease.

11 West Eighth Street.

TYPHOID AGGLUTININ REACTION IN A CASE OF EPIDEMIC CEREBROSPINAL MENINGITIS

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AND

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Laboratory workers who have dealt extensively with experiments in agglutination have felt doubt at times as to the reliability of a given reaction, away from the associated clinical findings. With the knowledge that the agglutination phenomenon is essentially a quantitative one, the question arises: Is the dilution of the serum too large for the feebly developed agglutinins; is it large enough to differentiate the specific agglutinins from the normal and from co-agglutinins or group agglutinins? This question of dilution becomes particularly important in cases of evident mixed infection.

While, with relatively high dilutions, the less strongly developed normal agglutinins and co-agglutinins are usually ruled out, there still remain a number of cases in which the results are decidedly at variance with the

specific reaction with the ordinary laboratory technic, as is illustrated in the following case:

Patient.—Max M., laborer, aged 40, Hungarian, came to this country two years ago. He had had no illness of any kind during the last year.

Present Illness.—The patient had been working daily during that period. On April 10 or 11, 1908, he began to feel moderate general malaise. This malaise, however, did not keep him from going to work. On Thursday, April 16, he failed to report for breakfast. Attempts to arouse him were futile. He was removed from the boarding house to the Emergency Hospital. During the first twelve hours of his stay at the hospital he was semiconscious, and complained of excruciating headache. Delirium followed. The abdominal walls were rigid, especially on the right side. On Friday, April 17, the same symptoms with additional opisthotonus were present, and on Saturday the same symptoms with additional development of internal strabismus. The blood serum was now examined for typhoid agglutinins by Dr. George C. Ruhland, of the Milwaukee Health Department, with positive results, the details of which are described below. On Sunday, April 19, there was profound comatose delirium and development of râles of a moderately moist character on the right side and "moderate" albuminuria. Death ensued Monday morning, April 20. (We are indebted for this report to Dr. Alexander McKinley, of the Emergency Hospital.)

Necropsy.—April 20, 1908. (Irrelevant factors are omitted.) The body was still warm, with no development of rigor mortis. There was marked internal strabismus. The scleræ of both eyes showed a diffuse reddening and were studded with discrete petechiæ.

Cranial Viscera.—When the skull was opened the subdural space was seen to be tensely filled with fluid. Puncture of the taut dura caused a gush of a considerable quanity of slightly turbid, sanguinolent, cerebrospinal fluid. The entire convexity of the brain was covered with a more or less thick, fibrinopurulent material, of a greenish-yellow color. Its consistency was greater in the recesses than on the apices of the gyri. The volume of this exudate increased in direct proportion with the blood supply. It was, therefore, most copious at the base of the brain. There was intense congestion of the pia mater. The brain substance, proper, showed little involvement to the naked eye. The coverings of the spinal cord were in a similar condition, but to a slighter degree. Microscopic examination of the smears showed numerous Gram-negative, intracellular and extracellular diplococci, resembling, to a certain degree, the gonococcus. There were no cells, however, that contained more than two pairs of the micro-organisms, the Diplococcus intracellularis of meningitis. Careful scrutiny of the entrance points of the blood vessels into the cranial cavity did not reveal the avenue of infection.

Abdominal Viscera: The peritoneum was smooth and glistening; the omentum covered all of the small intestines. The peritoneal blood vessels were negative. The situs of the abdominal viscera was negative. The bladder was distended with urine and protruded 8 cm. above the symphysis pubis. The mesenteric lymph nodes were just perceptibly increased, in no way approximating the degree of enlargement found in typhoid or convalescence therefrom. The spleen measured 10 by 6.5 by 3 cm. It was negative. The liver was slightly increased in size. It cut smoothly and was of a brownish-purple color. The hepatic veins were patent and distended; there was venous congestion. Both kidneys showed normal dimensions and were otherwise negative.

Thoracic Viscera: Easily soluble, fibrous adhesions were found in the right pleural cavity, involving the upper and middle lobe of the lung. The lung itself, however, crepitated throughout and floated well above the surface of the water. The middle and lower lobes of the lung contained a smaller amount of air and showed numerous areas of peribronchial reddening and consolidation. The bronchi showed a deeply reddened and swollen mucosa, especially in their narrower ramifications. Similar conditions prevailed in the left lung. Microscopy of the lung tissue revealed a bronchopneumonia, due to aspiration of infected material, very probably during unconsciousness. The bacteriology shows a rather variegated flora of micro-organisms; no pneumococci of Fraenkel and no intracellular diplococci.

Agglutination Test.—In applying the agglutination test, a dilution of the serum of 1 to 100 was used, on a typhoid culture in bouillon not over twenty-four hours old. Positive agglutination was complete within twenty minutes. The culture was a transfer from a regular laboratory stock culture and by no means too attenuated, nor can any fault be ascribed to the physiologic salt solution used in making the dilutions.

We feel convinced of the reliableness of our results from the report made by Symmers and Wilson,* whose findings are identical in the history, postmortem appearances and the agglutination tests, except that in the case reported by them the Widal reaction was obtained in even a dilution of 1 to 200 within fifteen minutes.

We are aware, of course, of the fact that while agglutinins may be nearly, if not quite, specific in their action, a serum which produces agglutination may be far from being so; also, that such agglutinins may be produced by micro-organisms which we do not ordinarily regard as being related, as, for instance, certain varieties of proteus and staphylococcus, which, according to Stern, produce sera of marked agglutinating power for typhoid bacilli also.

While we are almost certain that the specific agglutinins of typhoid and for the *Diplococcus intracellularis* are quite distinct, and that higher dilutions of the serum of this patient would have ultimately agglutinated only with the meningococcus, yet the case appeared to us of sufficient interest for practical purposes to indicate the desirability of its publication here.

It might be added, in support of the diagnosis of the epidemic character of the case, that simultaneously with this one another inhabitant of the same boarding-house was taken with a disease presenting the same symptom-complex and died a day previous at the same hospital. The physician who performed the necropsy did not enter the cranium, and reported the case as ptomain poisoning.

1030 Grand Avenue.

* Symmers, W. S., and Wilson, W. J.: Epidemic Cerebrospinal Meningitis with Typhoid Agglutinins in the Blood, Brit. Med. Jour., Sept. 21, 1907.

TOXIC EFFECTS FROM BISMUTH SUBNITRATE

WITH REPORTS OF CASES TO DATE

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Toxic effects from the use of bismuth subnitrate in medicine and surgery are so rare that until recently physicians have regarded its administration as perfectly harmless. Schuler[1] and Bardeleben[2] have pronounced its action non-toxic. The latter treated 100 extensive burns by dusting them with bismuth subnitrate and observed no unpleasant symptoms therefrom. Professor Mühlig[3] administered 20 gm. daily for a prolonged period without producing any poisonous effect.

It was, therefore, not surprising that when radiographers began to use bismuth subnitrate for the purpose of obtaining radiographs of the stomach and intestines, they had no hesitancy in administering large doses, and boasted of the safety with which as much as 40 gm. in one dose could be administered.

1. Ztschr. f. Chir., 1885, cited from Novak.
2. Deutsch. med. Wchnschr., 1892, No. 23, p. 544.
3. München. med. Wchnschr., 1901, No. 15, p. 592.

Cases of poisoning resulting from the administration of bismuth subnitrate have been reported as early as 1793, but these were thought to be due to the impurities in the drug, such as arsenic. The first authentic report of bismuth poisoning was made by T. Kocher,[4] in 1882, who observed that the insoluble bismuth preparation, when applied to large wound surfaces, was capable of yielding so much bismuth absorption as to produce poisonous effects, characterized by acute stomatitis, black discoloration of the mucous membrane, usually beginning at the border of the teeth but later spreading over the whole mouth, followed by intestinal catarrh, pain and diarrhea, and in severe cases by desquamative nephritis.

Similar cases were reported by Professor Peterson.[5] Thereafter the literature remained silent on the subject until 1901, when Professor Mühlig reported two cases of severe burns in which pure bismuth subnitrate was applied, and severe symptoms of bismuth poisoning appeared two weeks after application. In both cases symptoms disappeared as soon as the wounds were curetted.

A similar case was reported by Dressman,[6] in which an extensive burn of the third degree was dressed with a bismuth salve and the characteristic symptoms appeared three weeks later. While the symptoms abated as soon as the applications were stopped, the blue marks around the teeth remained for six months.

Wordan, Sailor, Pancoast and Davis[7] reported two cases, in which 60 and 120 gm. respectively were administered each in one dose. Both cases developed the characteristic symptoms of bismuth poisoning and both recovered.

The first fatal case directly traceable to the administration of bismuth subnitrate for diagnostic purposes is reported by Bennecke and Hoffman:[8]

To a three weeks' old child (suffering from enteritis, weak and emaciated), a mixture of 3 gm. of bismuth subnitrate in 100 c.c. of buttermilk was administered by stomach, in order to diagnose a pyloric stenosis by Roentgenogram. Twelve hours later the child developed cyanosis, collapse, and died in three hours. Postmortem revealed bismuth in the bowel and small quantities in the liver and blood. Methemoglobinemia was present.

From the same clinic a similar case was reported by Boehme:[9]

Patient.—A child, one and a half years old, markedly rachitic, artificially fed and marasmic, received a few grams of bismuth subnitrate by stomach for radiographic purposes. The stomach was washed and no symptoms of poisoning appeared. Two days later a few grams of bismuth subnitrate were injected per rectum for same purpose, and again the bismuth was washed out. Three hours later the child was suddenly seized with pain, cried, became cyanotic, pale, skin cool, pulse small, and died in twenty to thirty minutes.

Autopsy.—Distinct methemoglobinemia; all the mucous membranes were brownish discolored; there was marked rachitis, dilatation of stomach, with stenosis of pylorus. The colon contained large quantities of black and white bismuth.

Professor Hefter suggested that death might have been caused by nitrite poisoning. The blood and pericardial fluids were tested, and in both nitrites were found. Bismuth could not be detected in the liver or blood. These chemical findings threw new light on both cases and prompted Dr. Boehme to determine the true cause of bismuth subnitrate poisoning. The results of his experiments were as follows:

Boehme proved by test-tube and animal experiments that the feces of children, when in contact with bismuth subnitrate, would liberate nitrites which would be quickly absorbed from the intestine and found in the urine. While methemoglobinemia was not caused by the absorption, it must be assumed that the absorption of larger quantities would produce methemoglobinemia. Experiments proved this to be a fact.

Collishon[10] reports two cases of accidental nitrite poisoning, in which the sodium nitrite instead of the sodium nitrate was given. The symptoms were cyanosis, extreme weakness, and a grayish-blue discoloration of the mucous membrane and the tongue. The symptoms were so severe as to produce collapse, but cleared up after the drug was discontinued.

Binz[11] injected small doses of sodium nitrite into dogs, causing their death in a few hours, with symptoms of gastroenteritis and methemoglobinemia.

Harnack[12] caused the death of a cat within five minutes after the administration of 5 gm. of sodium nitrite. Methemoglobinemia was present.

Routenberg[13] reported a case in which a methemoglobinemia with the usual symptoms of nitrite poisoning followed the rectal injection of 50 gm. of bismuth subnitrite in 400 c.c. of oil of sesame. While Routenberg ascribes the poisoning to the contamination of the oil, the analogy with other similar cases leads one to suspect that it was a case of nitrite poisoning.

A recent report of a fatal nitrite poisoning due to bismuth subnitrate is published by Novak and Gutig:[14]

Patient.—A man, 44 years of age, in July, 1908, received a rectal injection of four tablespoonfuls of bismuth subnitrate suspended in two liters of water, for the purpose of testing an intestinal obstruction.

Intoxication.—Soon after the *x*-ray examination the bowels were washed out, and while he showed no symptoms on retiring, early in the morning the nurse discovered a discoloration of the patient's skin. Gradually the patient became grayish-green, his mucous membranes cyanotic, his temperature 40, his pulse 96, his breathing stertorous. No response could be elicited. Venesection revealed blood to be of chocolate color, due to methemoglobinemia. The patient died eighteen hours after the rectal injection of bismuth subnitrate.

Spectroscopic Examination of Blood.—A few hours after death this showed that the blood again became normal, the brown color being changed to red, showing that methemoglobinemia had disappeared after death.

Experiments by Novak and Gutig prove that some animals, as, for instance, cats, are very susceptible to bismuth poisoning, while dogs and rabbits tolerate large doses.

It has been proved that nitrites, when formed, may be neutralized. If iodin nitrate be added to feces containing nitrites the latter will disappear in two or three days. Maasen has proved that certain bacteria in the bowel convert the nitrites into ammonia or into nitrogen. It is likely that the bismuth subnitrate ingested always causes a liberation of small quantities of nitrites, which are either absorbed and owing to the small amount cause no toxic symptoms, or are changed in the intestine into ammonia or nitrogen.

4. Samml. klin. Vortr. (Volkmann's), 1882, No. 224, p. 1907.
5. Deutsch. med. Wchnschr., June 20, 1883.
6. München. med. Wchnschr., 1901, No. 6, p. 238.
7. Univ. Penn. Bull., 1906, August, 1906, p. 122.
8. München. med. Wchnschr., 1906, No. 19.
9. Arch. f. Exper. Path. and Pharmacol., 1907, p. 441.
10. Deutsch. med. Wchnschr., 1889, No. 41.
11. Arch. f. exper. Path. u. Pharmakol., xlii.
12. Arch. f. exper. Path. u. Pharmakol., October, 1908, p. 246.
13. Berl. klin. Wchnschr., 1906, No. 43, p. 1307.
14. Berl. klin. Wchnschr., 1908, No. 39, p. 1764.

When, however, large quantities of bismuth subnitrate are given, and the liberation of nitrites is abundant and can not be neutralized quickly, so that large quantities of nitrites are absorbed, typical symptoms of nitrite poisoning will appear. Alcohols and glycerin accelerate the formation of nitrites in the intestines. This suggests a practical point, namely: When a case of nitrite poisoning is encountered alcoholics and glycerin should be withheld from ingestion and some form of iodin should be administered.

From these experiments and reports of fatal cases it must be concluded that the poisonous effects of bismuth subnitrate were not due to the absorption of the metalic bismuth, but to the absorption of nitrites, which caused the methemoglobin to precipitate in the blood. The methemoglobinemia appears to be the factor producing most of the clinical symptoms, the cyanosis, dyspnea, diarrhea and cramps. These symptoms indicate that the sudden change in the blood impairs the internal or tissue respiration, and the patients succumb with symptoms of suffocation.

It appears that the intestine, and especially the sigmoid and the rectum, are the laboratories for the liberation of nitrites. The bacteria in this part of the intestinal tract evidently are the nitrite-splitting factors whereas those in the stomach and small intestine allow the bismuth subnitrate to pass into the large intestine without liberation of larger quantities of nitrites.

In the fatal cases thus far reported the patients were all suffering from intestinal diseases, especially diarrhea or constipation, which suggests that the intestinal putrefaction accelerated the nitric formation and rapid poisoning.

During the past two years I have employed bismuth subnitrate extensively in the treatment of empyema, sinuses and abscess cavities[15] by injecting into the cavities a mixture containing 33 per cent. bismuth subnitrate incorporated in vaselin. The question arose as to what became of the bismuth paste after injection. A study of the subject revealed the fact that if the paste was not discharged from the sinus soon after injection, but was retained, it became encapsulated and absorbed. In non-resilient cavities, as in bone, the mass was gradually penetrated from all sides by fibroblasts and gradually replaced by connective tissue, while in collapsible cavities, such as the pleura, the expanding lung gradually replaced the slowly absorbed bismuth paste. This could be confirmed by taking radiographs of the regions so injected, at certain intervals.

This, then, proves that the bismuth paste is absorbed, and the question arises: How is the bismuth excreted, and is its absorption harmful? These two problems are now being investigated, but as the investigation is not completed, I shall in this paper bring forth only definite practical facts and defer the publication of the theoretical aspect of the investigation until the data obtained warrant definite conclusions.

From the experiments of Harnack,[16] M. M. Bergeret[17] and E. S. Wood[18] it may be concluded that the bismuth is slowly absorbed and slowly eliminated.

Before attempting to answer the question whether the absorption is harmful, it is necessary to decide whether the harmful effects noted in the cases reported are due to the absorption of the liberated nitrites or of the bismuth itself. After comparing the symptoms of the two cases reported by Collishon, which were caused by sodium nitrite poisoning, with those of other authors, caused by the administration of bismuth subnitrate, one can hardly doubt that the source of poisoning is identical and that the nitrites are the factors which are responsible for the sudden and violent attacks of poisoning. This fact is supported by the experiments of Boehme, and Novak and Gutig.

In my experience of two and one-half years with the injection of bismuth vaselin into sinuses and abscess cavities I have not encountered any case in which the train of symptoms would correspond to that of an acute nitrite poisoning, so graphically described by the various authors who have met with these cases. In many cases I have noticed a slight lividity of the mucous membranes and skin and a bluish border at the margin of the teeth; otherwise conditions were perfectly normal. In only one case did I note a distinct ulceration in the mouth, which was characteristic of the bismuth absorption as described by Kocher. In another case, that of an empyema pleuræ, I injected into the pleural cavity 720 gm. of 33 per cent. bismuth paste, which was retained there for six weeks; then the patient developed a desquamative nephritis, albuminuria, rapid loss of previously gained weight and the blue border around the teeth. As soon as the bismuth paste was withdrawn by means of an injection of olive oil and the application of a specially devised suction pump, all the symptoms disappeared and the patient regained his weight in a few weeks.

I desire to record a case referred to me by Dr. Roberts, in which the bismuth injections had caused severe bismuth intoxication, and after the symptoms abated the patient died:

Patient.—R., a lawyer, aged 57, for many years an invalid, had had tuberculosis of the hip since 1896, and after extensive operations retained several sinuses which discharged large quantities of foul pus.

Bismuth Injections.—In March a 33 per cent. bismuth vaselin paste had been injected into the sinuses by Dr. Roberts twenty times in a period of sixty days, the total amount representing about 400 gm. of pure bismuth subnitrate.

Intoxication.—While the patient's general condition improved at first and the sinuses healed, he gradually developed all the signs of typical bismuth intoxication as described by Kocher. The mucous membrane of the mouth and gums became bluish-black with ulcerations, his teeth became loose and his lips edematous. He experienced great thirst, diarrhea, and had nephritis. The symptoms gradually abated, the patient became well enough to resume his work as an attorney, and for two months was active in his vocation. A radiograph taken of his pelvis demonstrated that there were only small quantities of bismuth within the tissues, but they appeared to be disseminated through the entire pelvis.

Later History.—Aug. 1, 1908, the patient fell and injured his wrist, and a large abscess was formed, which was operated on by Dr. Verity. A large area of necrosis followed. From this time the patient's temperature varied from 99 to 101.5. He lost in strength; his urine was loaded with casts and albumin; his heart became weaker and irregular, and he died Aug. 16, 1908.

Autopsy.—This, made by Dr. Gehrman and myself, revealed all organs practically negative except the kidneys, which showed evidences of incipient contraction, the capsule being irregularly depressed, and the intestines, which were lined with a mucous membrane, resembled huckleberry jam in color.

Histologic Examination.—The microscopic examination of tissues from the liver, spleen, kidney, heart muscle and intestine, and the chemical analysis of tissues were made by Dr. Maximilian Herzog. His report is as follows:

15. Illinois Med. Jour., April, 1908, xiii, 402; July, 1908, xiv, 38.
16. Arzneilehre, 1883, p. 383.
17. Jour. de l'anat., 1873, p. 242.
18. Tr. Am. Neurol. Assn., 1883, p. 23.

Liver: A number of parenchyma cells showed bile granules in their paraplasm. Whether the latter also contained here and there bismuth could not be definitely decided, since no microchemical reaction for bismuth is known. It appeared, however, that the granules darker than the bile granules which were found frequently in the liver cells were bismuth granules. The latter could first be seen distinctly and beyond doubt in the intralobular capillaries. The dark granules were seen in the lumen of the small vessels, and crowded in fusiform cells, probably the star cells of Kupfer. In the interlobular veins (the terminal branches of the portal vein) bismuth was present to a large extent; it was found in the vascular endothelium and deposited in the form of fine granules on the free surface of the intima. Bismuth was also occasionally found in the small interlobular bile ducts, but the biliary ducts and capillaries were generally collapsed and empty.

Kidneys: The renal tissue showed chronic interstitial changes with hyaline degeneration of a considerable number of glomeruli. A few of the degenerated hyaline spheres contained lime salts. Some tubules contained hyaline casts; here and there the tubular epithelia showed marked cloudy swelling. There was no bismuth present in the renal sections.

Spleen: There was some thickening of the capsule and of the trabeculæ noticeable. The pulp spaces were not very distinct and were well crowded with erythrocytes and leucocytes. The Malpighian bodies were not well defined. Some bismuth was present in the shape of amorphous granules and denser masses in the pulp spaces.

Myocardium: Fairly normal.

Intestinal and Lymphoid Tissues: The intestinal tissues showed an extensive infiltration of the mucosa with bismuth. The lymphoid tissue likewise showed bismuth and much of the latter was found in the veins of the submucosa.

Chemical Examination.—The heart muscle contained a faint trace of bismuth. The spleen (very small piece) gave a distinct reaction for bismuth. The liver contained 0.13 per cent. of bismuth oxid. The tissue was pressed fairly dry between filter paper. The total weight of the specimen was 2.292 gm. and the total ash weight 0.03 gm., in which bismuth oxid amounts to 0.003 gm.

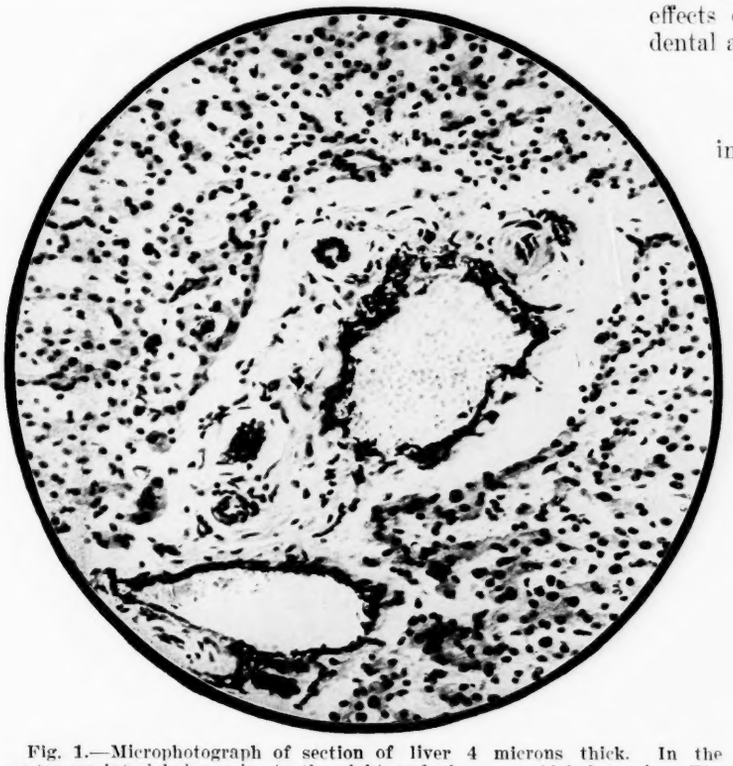

Fig. 1.—Microphotograph of section of liver 4 microns thick. In the center an interlobular vein, to the right and above a sublobular vein. The intima of both lined with bismuth. Magnification, 210 diameters.

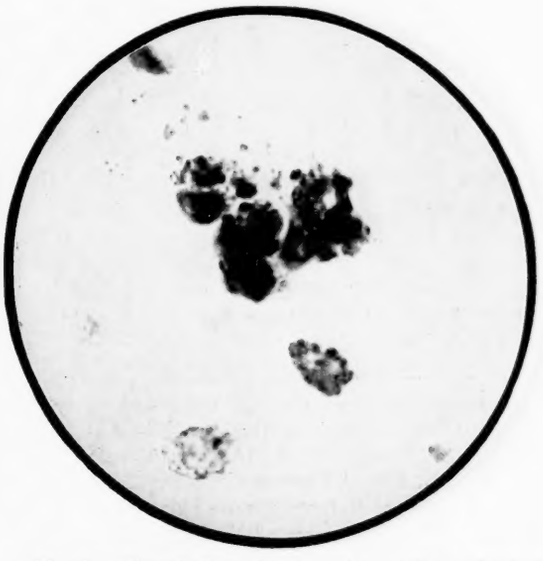

Fig. 2.—Microphotograph of section of liver about 4 microns thick. Some liver cells loaded with bismuth. Magnification, 1,000 diameters.

The above case does not present the typical symptoms of an acute nitrite poisoning, such as collapse, cyanosis, etc., and while the absorption of the metal bismuth is proved by microscopic examination and chemical analysis, the question still remains whether the absorption and presence of metallic bismuth in the tissues was a cause of death. The pathologic changes in this liver, spleen and heart muscle do not indicate that a severe destructive process which would interfere with function was going on. The interstitial nephritis was probably not due to the bismuth absorption, since the renal tissue was free from deposits of the metal and many pathologic conditions could be expected in an old man who had for years suffered from a chronic suppurative disease. Dr. Verity reports to me that the patient was treated by him ten years ago for chronic nephritis.

The point open to debate is whether this case should go into literature classed as a fatal case of death from bismuth intoxication, or as a case of recovery from the effects of bismuth absorption, death being only accidental and due to other causes.

CONCLUSIONS

1. Bismuth subnitrate administered by stomach in small doses is harmless.

2. In the presence of certain bacteria, or the feces of children, bismuth subnitrate will liberate nitrites, which will be absorbed by the intestines and eliminated by the kidneys; and if the production is faster than the elimination, methemoglobinemia will result.

3. In larger doses per os bismuth subnitrate is liable to produce an acute nitrite poisoning, characterized by cyanosis, collapse, methemoglobinemia, and may terminate fatally.

4. Rectal injection of bismuth subnitrate may cause nitrite poisoning much quicker and more severe than when the drug is administered per os.

5. Children are more susceptible to nitrite poisoning from administration of bismuth subnitrate.

6. Persons suffering with intestinal putrefaction are more susceptible to nitrite poisoning when taking subnitrate of bismuth internally.

7. After the injection of large quantities of bismuth paste into suppurating sinuses, mild symptoms of nitrite intoxication may appear.

8. The bismuth injected into these sinuses and encapsulated will be gradually absorbed and may be found in the liver, spleen, muscles and intestines.

9. Characteristic symptoms of black borders of gums, ulcerations of mucous membranes, diarrhea, desquamative nephritis, may appear several weeks following the injection of the paste.

10. The acute nitrite poisoning is to be regarded as a distinctly separate affection from the more chronic bismuth absorption.

11. Radiographers should employ some other preparation of bismuth instead of the nitrate, and refrain from injections of subnitrate into the bowels, especially if intestinal putrefaction is present.

173 Lake View Avenue.

A DECEPTIVE CASE OF LEPROSY *

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REPORT BY DR. WHITE

In August, 1907, a young woman from Courland, Russia, was referred to the skin department of the Massachusetts General Hospital for diagnosis. She had been treated one week previously in the "throat room" for "chronic rhinitis" and at her second visit blue-red papules had been discovered on her arm and she was consequently referred to us. The diagnosis of leprosy was made and subsequently corroborated by Dr. Richardson's pathologic findings and the girl was taken to the state leprosorium.

A few days later the board of health of Brookline was informed by an anonymous letter that another leper was working as a servant at a certain residence in that town. The members of the board made an immediate investigation at the house mentioned, but found that the young woman in question had disappeared. Two days afterward this suspected individual presented herself voluntarily at the skin clinic of the Massachusetts General Hospital and was sent to the skin ward for observation and study.

History.—The patient, a young woman, aged 19, was born in a village in the Baltic province of Courland.[1] She stated that her father was dead (cause unknown), but that her mother and brothers were alive and well in their native village. At the age of ten a cutaneous eruption appeared, and on its subsidence scars were found on the right elbow, which still exist. In December, 1906, a sore developed on the genitals and was followed by a rash but no evidence of any labial cicatrix was visible at our first examination. In July, 1907, another outbreak on the skin occurred and was treated by a neighboring physician, but unfortunately his testimony could not be secured. During the last year the girl had been well except for occasional headaches. This was all that could be gleaned from the past history of the case. At entrance on Aug. 24, 1907, the patient stated that the present abnormal conditions began five days previously without any known cause, and she denied absolutely that she had taken any medicines before or since the appearance of her present symptoms.

Examination.—The general condition of the girl was fair; temperature 99.4 F., pulse 96, and respiration 25. The pupils were unequal in diameter and irregular in outline. The conjunctiva of the right eye, especially about the cornea, was considerably injected and pain and photophobia were present. The eyebrows were somewhat scanty, particularly at the distal ends. The tongue protruded straight and was covered with a slight, white coat. Cervical, axillary, epitrochlear and inguinal glands were moderately enlarged and shotty to the touch. The neck was not rigid or tender. Examination of the internal organs revealed nothing abnormal save a soft systolic murmur at the apex of the heart which was transmitted but a short distance toward the axilla. The knee jerks were present and equal. The cutaneous eruption, however, proved more interesting. The face was rather generally suffused and edematous and the nose, in particular, seemed swollen. There were no nodules here, but the lateral diameter was evidently increased and this feature persisted throughout the fourteen weeks of observation. In addition to these general appearances the face, forearms, hands and lower legs showed thickly scattered, round, pea to dime-sized, brick-red macules and maculo-papules with bluish centers. The trunk exhibited a few similar lesions. On the lower legs, especially on the extensor surfaces, more advanced lesions were apparent in the nature of numerous pea to dime-sized exulcerations covered with a sero-purulent, sometimes blackish crust.

Diagnosis.—Despite the anonymous letter and despite the long continued intimacy between this girl and her fellow-townswoman, whom we had so recently adjudged a leper, we were inclined to regard this present eruption as a form of autointoxication resembling erythema multiforme (possibly bullosum).

Treatment.—A soothing carbolic acid and zinc wash, boracic acid ointment, Epsom salts, a diet of milk and soft solids and atropin for the eyes were recommended.

Subsequent History.—On Aug. 27, 1907, three days later, the maculo-papular erythema had perceptibly diminished, the temperature was normal and the crusts had fallen but the ocular symptoms were still present, though to a lesser degree, and on the legs the exulcerations were drying up. Here, however, new features were now exposed consisting of several large pea-sized, round, deep, punched-out ulcers and several still larger pigmented scars. One of these chocolate-colored cicatrices was excised and sent to Dr. Richardson for examination as to the presence or absence of acid-fast bacilli. With these apparently typical gummatous ulcers and the presence of a general adenitis before us, coupled with the history of a previous genital sore, we now made the diagnosis of syphilis and began the tri-weekly injections of a sixth of a grain of bichlorid of mercury which were continued until Sept. 28, 1907.

On Aug. 30, 1907, Dr. Richardson reported the finding of numerous acid-fast bacilli in the sections from the cicatrix of the leg. It must be confessed that this finding was a great surprise, but nevertheless from a clinical standpoint, we were unwilling to believe that the disease was leprosy. Under ether a two-inch incision was made over a subcutaneous mass felt about three inches above the left elbow in the region of the ulnar nerve and two large pea-sized nodules, apparently glands, were dissected out. The nerve itself was found to be perfectly normal. In addition, a small crusted lesion was excised from the right leg, half way between the knee and ankle. An examination of the urine showed it to be slightly cloudy, 1.025 in specific gravity, without albumin or sugar, and containing in its sediment a few round cells, a rare blood globule, but no acid-fast bacilli.

On Aug. 31, 1907, the skin was carefully examined for anesthesia but none was found. The rash had now entirely faded, leaving some pigmentation and a slight, superficial, branny desquamation. The blood showed 100 per cent. of hemoglobin, and a differential count of polymorphonuclears 77

* Read in the Section on Cutaneous Medicine and Surgery of the American Medical Association, at the Fifty-ninth Annual Session, held in Chicago, June, 1908.

1. At the Lepra Conference of 1896, it was recorded among other statistics that 134 lepers were known to be living in this province.

per cent., mononuclears 21 per cent., and eosinophiles 2 per cent.

Two days later the board of health insisted on transferring the patient to the Detention Hospital, but on the following day, as the result of our protests, and because certain members of the city board of health and of the state board of charities regarded the disease as syphilis, the young woman was returned to our care. On readmittance it was found that the superficial scaling, first observed four days previously, was still present.

On Sept. 5, 1907, Prof. Eric Hoffmann, of Berlin, was kind enough to make a thorough examination of the patient. Nothing was told him about the girl and no mention of the pathologic findings was made until afterwards, and this was the rule followed with all the distinguished foreigners[2] whom we were fortunate enough to be able to call in consultation over this puzzling case. Professor Hoffmann's diagnosis was syphilis, possibly complicated with tuberculosis or a tuberculide. Prof. James C. White studied the case also and made the diagnosis of syphilis. In the afternoon 0.001 gram of old tuberculin was administered subcutaneously.

On Sept. 6, 1907, Prof. Bertarelli and Dr. Pizzini of Milan kindly looked the patient over very carefully and both stated that in their opinion she was suffering from syphilis. They also wished to have borne in mind the possibility of a complicating tuberculosis or a tuberculide. The two-hourly chart kept since the injection of the tuberculin showed no temperature exceeding 99 F. The urinary examination revealed no changes, save a lower specific gravity (1.017) from that of the previous week.

Fig. 1.—Showing the abundance and distribution of the healed ulcers on the lower part of the leg.

On Sept. 10, 1907, the areas of pigmentation were fading away. The patient was bearing well the injections of mercury, but complained somewhat of pain for a few hours after each dose was administered. Dr. A. Quackenboss of the Massachusetts Eye and Ear Infirmary made an ocular examination. He reported that the right eye showed evidence of a previous iritis with one adhesion and several spots on the anterior capsule. The left eye also presented signs of previous iritis.

On Sept. 12, 1907, 0.005 gram of old tuberculin were injected at 5 p. m. The two-hourly chart recorded during the next twenty-four hours, as before, no temperature in excess of 99 F.

On Sept. 16, 1907, Dr. Hallopeau of Paris and Dr. Whitfield of London were good enough to make a thorough examination of the patient and both of these gentlemen were convinced that the girl was the victim of syphilis. In order to study the nasal secretion, 20 grains of iodid of potash t. i. d. were ordered in the hope of producing a coryza.

On the following day, Dr. Radcliffe-Crocker of London came to see the patient, but he had been told of the case and its pathologic details by his compatriot, Dr. Whitfield, and consequently was unwilling to commit himself to a definite opinion. That morning the girl's temperature was 101 F., and in the afternoon it climbed to 102 F. Concomitantly there was a slight return of the erythema and edema of the face and a feeling of general malaise. [In the light of our present maturer conception of this girl's condition, we are inclined to regard this occurrence and the severer earlier outbreak on admission as explosions of leprosy bacilli from some focus into the general circulation rather than a possible reaction from the iodid of potash administered during the previous twenty-four hours.]

On Sept. 18, 1907, Dr. W. R. Brinkerhoff of the government leprosy staff of Honolulu saw the patient and stated

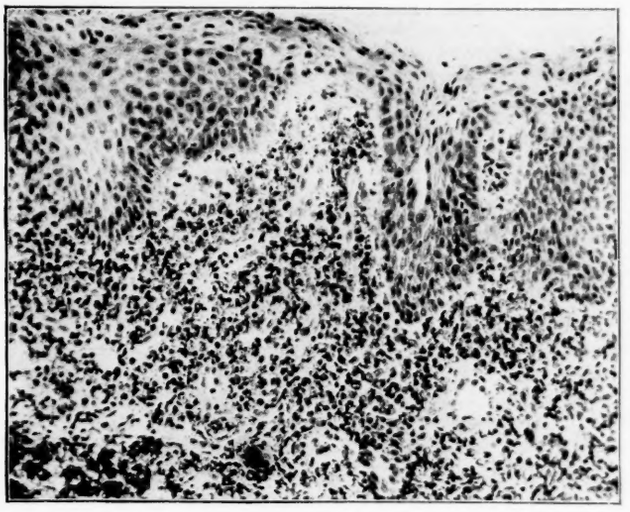

Fig. 2.—Section showing the histopathology of one of the late nasal nodules. Note the unusual development of cells up to the epidermis itself; the absence of giant and of leprous cells; the dilatation of the lymph vessels with their vesicular nuclei.

that there was no clinical evidence of leprosy except in the scantiness of the eyebrows and in the thickening of the nose. After an examination of the pathologic sections he said that the bacilli seemed shorter and thicker than the leprosy bacilli he was accustomed to see at Molokai, but the tissues and the arrangement of bacilli were very suggestive of

Fig. 3.—Section illustrating three typical leprous cells. Note their dissimilar size and shape, their vacuoles and their numerous bacilli.

leprosy and not at all compatible with our ideas of tuberculosis.

There had been no increase of nasal secretion resulting from the administration of iodid of potash and several smears from the nose, stained carefully with hot carbolfuchsin and Gabbet's blue, failed to reveal any acid-fast bacilli. The ulcers on the legs were now healed—twenty-five days after

2. Passing through Boston on their way to or from the Sixth International Dermatological Congress.

entrance and after ten injections of 1/6 of a grain of bichlorid of mercury—but a very marked pigmentation of the skin remained at their sites.

On Sept. 20, 1907, Dr. H. C. Baldwin of the neurologic staff of the hospital made a careful examination of the sensations of the skin and of the general reflexes, but found nothing abnormal. The weight was now 102 pounds.

On Sept. 27, 1907, two small, hard, pea-sized nodules were noticed for the first time on the right arm, but in the opinion of the patient these lumps had been present for at least a month. They were both hard, not raised above the skin, and were freely movable with the integument. One-sixth of a grain of pilocarpin was injected in order to study the nature of the sweat secretion, but the reaction, although present, was so slight that nothing definite was learned.

On Sept. 29, 1907, under ether, an incision was made over the right elbow and a pea-sized mass lying in contact with the ulnar nerve was excised and sent to Dr. Richardson. At the same time smears were made on various culture media from the juice of this gland. The nerve itself seemed smooth and normal in appearance.

On October 1 the patient passed into the service of Dr. J. T. Bowen, but he kindly allowed us to continue our investigations.

Second Examination.—Two days later we made a systematic clinical examination of the girl. The eyebrows were mostly gone except in the middle. There were no nodules to be felt. The corneæ showed a few dilated veins. The pupils were widely dilated but the circles were not perfect. On the forehead there was one irregularly-circular, rather deep cicatrix. The skin of the nose was somewhat seborrheic, but without dilated follicular orifices. The nose was broad at the alæ. The cheeks were flushed and on them were noted one round-topped, dark red papule with a delicate collarette of exfoliated epithelium and four small, deepish, oval scars. Near the right angle of the mouth, but not radiating from it, were three pin-head, shallow scars. The ears were normal and bore no nodules. The hair was fair in color, distinctly abundant, and not in the least dry. The back showed nothing abnormal, save a few, faint, irregularly distributed macules. The axillæ presented normal and dark hairs and the localized sweating was rather profuse. The skin of the chest was not remarkable except for the presence of numerous, dull-red macules suggesting cutis marmorata. On the left upper arm, near the outer condyle, was found an oval, pea-sized, blue-red scar and on the inner side the marks of the biopsy of Sept. 29, 1907. The left forearm exhibited five, dull red, subsiding papules, some of which could be more aptly designated as scars. The right upper and lower arms were quite similar to the left. The hands were blue and cold and rather moist, but bore no pathologic lesions. On the right buttock were eight fading blue-red papules and scars. The largest papule was firm and infiltrated and three-eighths of an inch in diameter. Seventeen similar, smaller and larger papules were counted on the right thigh. The left buttock presented one blue-red, flat, oval tubercle, slightly infiltrated and firm. The left thigh showed eight blue-red macules with accompanying scar formation. On the right leg were found (Fig. 1) on the inside, front and outside of the middle third, blue-black, round or oval, dry scars, the remains of the previous exulcerations and other antecedent lesions. There was some originally appeared as a typical gummatous ulcer. The feet confluence noted, but no grouping as in typical late syphilis and nearly seventy-five of these cicatrices were counted. The left leg presented a somewhat analogous picture and below the patella was found a circular scar, the remnant of what were normal except for the dryness of the skin.

On Oct. 5, 1907, a nodule was excised from the right ulnar region.

On October 11 the weight was 105 pounds and 6 ounces. Two days later the records state that the patient was up all day, "felt splendid," and had an excellent appetite. This satisfactory condition existed despite the frequent mental perturbations caused by our numerous investigations and despite her compulsory and really almost solitary confinement in her narrow hospital room.

On Oct. 16, 1907, another biopsy was made, this time from a healed, mahogany-colored, smooth scar on the right leg, of a month's duration. On the following day the weight was 107 pounds.

On Oct. 22, 1907, Professor Veiel, of Cannstat, kindly made a most thorough examination of the patient and felt convinced that the lesions on the skin were syphilitic.

On Oct. 25, 1907, Dr. Richardson reported that the sections from the last biopsy were more typical of leprosy than any of their predecessors and that the acid-fast bacilli appeared in greater numbers.

On Oct. 28, 1907, a nasal examination was requested because lesions had been discovered and Dr. H. P. Mosher of the throat department of the hospital reported that the mucous membrane of the nose was rather dry and that a small yellowish tubercle was present on the anterior end of the left inferior turbinate bone. The pharynx and larynx were normal.

On the following day Dr. Algernon Coolidge, the senior physician of the throat department asked to see the patient and found three large pin-head sized points under the epithelium of the mucous membrane on each side of the septum nasi and a similar growth on the anterior end of the left inferior turbinate. One of these lesions was excised. Dr. G. H. Waterman of the neurologic department of the hospital examined the cutaneous reactions of the patient and found nothing abnormal save a slight insensibility to pin prick over the dorsum of both feet. Smears from the nose were stained with steaming carbol fuchsin and Gabbet's blue and for the first time a few grouped and clearly defined bacilli were found.

On Nov. 2, 1907, the weight was 111 pounds and 2 ounces.

On Nov. 19, 1907, an investigation of some of the finer diagnostic points of the disease was made and the following data were obtained:

1. *The presence of hair on the most affected parts of the body:* As a whole, over the legs normal hair existed in sufficient quantities except in the immediate vicinity of the scars, where it appeared only occasionally.

2. *Anesthesia in or near the scars:* None whatever, the most delicate pin prick being appreciated.

3. *The sensibility of the nasal mucous membrane:* This power was absolutely intact.

4. *The condition of the eyes:* The conjunctiva presented a few comparatively large vessels arranged in a radial manner. The iris was round and reacted perfectly to light. There were no nodules to be seen.

5. *Menstruation:* For the first time since entrance the patient menstruated during the first week of November, 1907.

6. *Glandular system:* In the right groin there was a large mass of soft, somewhat sensitive glands. On the left side there was one large soft element. In the left cervical region there was a chain of glands. No epitrochlear enlargements could be felt.

On Nov. 21, 1907, the weight was 116 pounds and 8 ounces. On the next day it was noted that no new cutaneous features had appeared but several minute ulcerations were observed on the mucous membrane of the nasal septum. The general health was most satisfactory.

On Nov. 24, 1907, we felt that the time had come when we could no longer doubt that the girl was a leper and she was therefore reluctantly turned over to the authorities for transfer to the state leprosorium on the island of Penikese.

Such is the detailed history of this unfortunate patient. It is easy enough for us now in the light of our present pathologic and bacteriologic knowledge to pronounce this case leprosy, but let it be well understood that until the nasal symptoms developed the dominant clinical features were not those of leprosy, as may be well appreciated when such distinguished European dermatologists as Bertarelli, Crocker, Hallopeau, Hoffmann, Pizzini, Veiel and Whitfield unanimously declared that the girl was syphilitic. When these gentlemen were informed, after pronouncing their opinions, that the pathologic sections were typical of leprosy

they could only shrug their shoulders with astonishment and incredulity.

Let me pause one moment before enumerating the conclusive pathologic details to record what clinical symptoms were present up to the late appearance of the nasal features which should have convinced us that we were dealing with leprosy and not with syphilis. After rather an extensive perusal of leprologic literature, I have been able to record only the following symptoms which coincide with the conditions found in the present case: Place of birth; edema and suffusion of the face, especially of the nose, accompanied by a general seborrhea and small acneiform papules; rarefaction of the eyebrows; conjunctivitis and iritis; general adenitis, cyanosis of the hands; irregular menstruation; ulcerations and, lastly, hyperpigmented scars with local and adjacent alopecia. But what a short and unconvincing list in such a protean disease as leprosy! Not one of these symptoms is pathognomonic and all of them are common to many pathologic processes.

On the other hand, we were confronted by an apparently healthy young girl who entered the hospital partially covered with a fairly typical but severe eruption of erythema multiforme, who later presented one absolutely characteristic gummatous ulceration and many other conceivably syphilitic exulcerations, who quickly freed herself from all these active symptoms after ten injections of mercury and in the face of the constant mental excitement of repeated examinations and biopsies, and who, despite her solitary confinement, gained fourteen and one-half pounds in two months. Such conditions made us extremely skeptical of the microscopic revelations, and until the nose began to develop its convincing symptoms we obstinately rejected the idea of leprosy and, supported by the most expert authorities, clung to the syphilitic conception of the process.

In concluding this part of the paper I wish to thank the various gentlemen whose names have appeared in the preceding pages for their conscientious examinations and diagnostic support, but I also wish to express my gratitude to Drs. Bowen, Towle, Burns, Oliver, C. G. Mixter and R. M. Green, members of our hospital staff, for their kind cooperation in our various investigations.

HISTOPATHOLOGY

The sections which form the basis of the following microscopic details were prepared and stained with carbol fuchsin and hematoxylin by Dr. Richardson, who has kindly allowed me to study them and report my findings.

HISTOLOGIC FINDINGS

1. *Sections from a healing subcutaneous nodular ulceration, excised from the left leg on Aug. 24, 1907.*

Epidermis.—The stratum corneum is very slightly developed and consists of a very fine layer of homogeneous cells free from nuclei. The stratum granulosum is composed of one to four layers of practically normal, keratohyalin-bearing cells. Over the areas where the papillæ are absent these cells are most abundant and in some instances exhibit a tendency toward nuclear shrinkage. The stratum spinosum is somewhat acanthotic and as a whole has stained poorly, for cellular boundaries are difficult to trace and this feature is particularly emphasized throughout the apapillary region. The nuclei for the most part are normal, although they incline somewhat toward hypertrophy. The stratum germinativum is well developed and persistent over the greater extent of the rete and here and there contains delicate pigmentary deposits.

Corium.—The papillary layer is unevenly but well differentiated except for a broad area in the center of the sections where the papillæ are wanting. The papillary vessels are not markedly dilated, but their endothelial cells are often swollen and at times vesicular. The perivascular spaces are crowded with mononuclear cells which in some instances block the entire papillary space. The striking feature of the corium is its rich cellular infiltration which is everywhere noticeable—these elements reaching even to the epidermis in the apapillary portion. [This phenomenon is unusual in the recorded histologic descriptions of the disease]. In addition to this general invasion there are band-like and oval areas, corresponding to vessels and sweat glands and follicles, where the cells appear in far greater abundance. These cells are principally swollen connective tissue cells, mononuclear leucocytes and some plasma cells with an occasional epithelioid element. Bacilli are not numerous, judged by the usual standard of leprosy. The elastic tissue is universally somewhat diminished. Near the epidermis elastin appears as short, broken, coarse fibers. In the cellular foci about the vessels elastin is totally wanting while in the neighborhood of the sweat glands it appears only in the structure of the glands themselves.

Gland from the left epitrochlear region excised on August 30.

The tissue is composed of lymphoid, endothelial and connective tissue cells. The acid-fast bacilli are unevenly distributed but wherever present they appear in great numbers, sometimes singly, but oftener in round or oval masses. As a rule the normal tissue becomes poor in cells in the areas of bacterial distribution and not infrequently vacuoles appear with the bacilli arranged excentrically around the vacuolar membrane. The organisms seldom present themselves as well defined rods but seem to be broken up into series of long dots. Zoogleal formation is abundant and characteristic and frequently the colonies are of great size. Blood vessels are rare but are normal when found. The determination of the intra- or extra-cellular emplacement of the organisms is always difficult to determine, but in the present instance it would seem as though the latter position was usually chosen. The gland is distinctly altered by the invasion of the disease. The acini have lost their identity, the vessels are few in number, the individual cells have vanished in many instances, and finally connective tissue is seen replacing the normal elements.

Healed scar from leg, excised on Aug. 30, 1907.

Epidermis.—The palisade layer of the rete is well differentiated and the cells are normal. The immediately adjacent superficial cells are also sound but in the next layers the normal structure is soon lost and the nuclei shrink and disappear, but the spinous processes of the cells persist. In the granular layer the cells are pale. The stratum corneum is thin, but otherwise normal.

Corium.—Papillæ are gone and vascular twigs are wanting in the immediate vicinity of the epidermis. The subpapillary vessels, however, are present, but decreased to a minimum. Their walls are normal, with the exception of some endothelial vesiculation and no bacteria were noted either intra- or extramurally. A large portion of the sections show marked cellular and bacillary infiltration—the remainder appearing as delicate scar tissue with moderately numerous, slightly swollen connective tissue nuclei. The deeper vessels are few in number and glands and follicles have gone.

The cellular areas are composed of many plasma cells, especially about the vessels, some lymphocytes and connective tissue cells and finally collections of lepra cells which play a dominating rôle in the picture. They are of various shapes and sizes; some elongated, others round or oval; some are anuclear, amorphous masses, others have generally distributed nuclei, and again others show distinct giant cell distribution of nuclei; some have a few vacuoles, others are composed almost entirely of empty spaces; some present zoogleal bacilli and others contain only one or two scattered organisms. Some of the isolated bacteria appear in close proximity to the epidermis, but none are seen in this layer of the skin.

Right epitrochlear gland, excised Sept. 29, 1907.

This gland differs from that of the left side in the relative paucity of its cellular contents. There is no such solid massing of cells—they are more evenly, though meagerly distrib-

uted. In addition, there are comparatively large areas from which cells have disappeared, leaving a vacuolar network the trabeculæ of which are usually lined with bacilli. Another striking dissimilarity is in the arrangement and distribution of the bacteria. Here the organisms are more evenly placed throughout the sections and occur usually as single elements or at times in small clumps. They are seldom found in a zoogleal state, but here and there a zooglea is noted in the center of a vacuole.

Once more it is evident that where the bacilli are most numerous there the normal collagenous structure is the poorest. The organisms are nowhere seen in the few vascular walls present. Fibrous tissue is replacing normal structures. Pigment granules, ocher colored or canary-yellow in hue, large or small, are found scattered throughout the sections.

Small sections from the edge of a one-month-old, mahogany-colored, smooth, shining cicatrix, excised from the leg on October 16, 1907.

Epidermis Rete.—The palisade layer is composed of cubical rather than the ordinary elongated cells. No pigment is found here or elsewhere in the epidermis. The overlying cells become almost immediately horizontal and compact, the spinous processes being rather inconspicuous and the nuclei in many instances being absent or again relatively prominent on account of the retraction of the surrounding cell protoplasm. The granular layer is comparatively thick and its cells also have lost some of their nuclei. The stratum corneum is also comparatively broad, in places compact, while in others the cells are expanded into a loose meshwork of six or seven layers of anucleated cells.

Corium.—The papillar layer is entirely wanting and the corium as a whole is composed of a dense structure of fibrous tissue containing numerous nuclei and supporting scattered upright vessels, some large dilated lymph spaces, abundant brilliant, ocher colored pigment granules and some sweat glands and ducts. The perivascular infiltrations are not marked except in the subcutaneous fat spaces and in the deeper layers of the corium, but here and around the sweat glands there are very prominent infiltrations composed of plasma cells and lymphocytes, with occasional connective tissue cells, the whole lying in a loose connective tissue reticulation. Except, therefore, in the deepest layers of the corium there are no suggestions of lepromata.

The study of the elastic tissue reveals a strange condition. The larger half of each section shows an excessively abundant normal elastin while the remaining portion is apparently altogether devoid of this element. I can offer no explanation for this phenomenon as the supporting collagen presents no other apparent abnormalities.

The preceding description of the corium affords a good idea of the distribution of the acid-fast bacilli. Where the lepromata appear, there one finds the organisms and the deeper in the sections one looks the more abundant become the bacteria. Therefore, in the upper corium no bacilli are found, in the middle strata an occasional short rod is noted, while in the depths of the layer around the vessels and especially in the subcutaneous fat closely packed, small clumps of the bacilli appear. The individual elements are for the most part short, thick rods while many dots, sometimes in long rows, complete the picture.

Nodule from the lower left turbinate, excised Oct. 29, 1907.

Epidermis.—The epidermis is well preserved in its lower layers. The cells are in the majority of instances well-formed, although the spines are indistinct and the nuclei everywhere emphatically vesicular with prominent nucleoli and numerous chromatin granules. Here and there appear areas of cloudy degeneration with accompanying disturbance or disappearance of nuclei. Karyokinesis is normally abundant throughout the layer. As the free surface is approached cells become amorphous and nuclei vanish.

Here for the first time in this series of sections lepra bacilli are visible in the epidermis. They exist as single, scattered elements or appear in foci, isolated or in small zoogleal, round groups. They are in all instances well preserved and are found at all levels of the epidermis. At one point a cell was observed with a beginning vacuole lying close to the nucleus and containing a clump of bacilli. In some areas it was thought that cellular degeneration and richness in bacteria went hand in hand, but for the most part the germ-bearing cells were well preserved. Interpapillary downgrowths of the rete were abundant here and there, becoming hair follicles containing bacilli within their walls.

Corium.—The picture here is extremely interesting, illustrating as it does the typical young leproma. Here lepra cells are absent and giant cells are represented by one example in fifteen sections. On the other hand bacilli are swarming in enormous numbers, the red coloring of the bacteria being almost as conspicuous as the blue-stained cellular elements. The structure is one of intense infiltration, the nature of the cells being difficult to determine. They are composed of oval or round vesicular nuclei containing numerous chromatin granules surrounded by a small amount of dull protoplasm, the individual cell outlines being hazily demarcated. Whether these elements are distorted connective tissue cells or whether they are lymphocytes is a perplexing question to answer. In addition there are a few polynuclear leucocytes and a very occasional plasma cell.

The papillæ are prominent and support very minute vessels containing bacilli intramurally and an occasional bacillus in their lumen. Otherwise, the papillæ are filled with the indeterminate, mononucleated cells just described. There is a marked tendency in these papillæ toward fatty degeneration, the cells being represented by hollow, yellow spheres bearing an infrequent bacillus but no nuclei. The leproma is practically contiguous with the epidermis—an unusual condition.

Throughout the corium there are a very few contracted blood vessels with somewhat vesicular nuclei and here and there a few bacilli. The lymph channels, however, are numerous and frequently form widely dilated spaces with round vesicular nuclei in their walls, and contain single or grouped bacilli and occasional erythrocytes and mononuclear leucocytes.

In the depths of the sections there are areas of degenerated collagen and elastin, but the sweat glands preserve their integrity and contain no bacilli. The bacillary invasion is extremely marked, the organisms appearing singly or in groups, intra- or extra-cellular, and often in the zoogleal state within a round or oval lymph space or else lining these cavities. The unique giant cell noted in these sections contained no bacilli. These acid-fast bacilli everywhere retained the fuchsin uniformly, no interruptions or dotlike structures being visible and this condition betokens their youth and activity.

In conclusion, I wish to thank Mr. L. S. Brown, photomicrographer to the Massachusetts General Hospital, for the two excellent photographs which illustrated so clearly some of the salient points in the histology of this case.

PATHOLOGIC REPORT BY DR. RICHARDSON

The foregoing record of a case of leprosy in the skin ward of this hospital during the service of Dr. C. J. White has many points of interest, one of which emphasizes the value of extended pathologic investigations in the study of the disease.

As Dr. White has stated, I examined in August, 1907, sections from a nodule in the skin taken from a case which clinically Dr. White diagnosed as leprosy (first case). The pathologic examination amply confirmed his diagnosis.

A short time after this examination I received from Dr. White another piece of tissue which had been removed from the margin of an ulcer on the leg of a young woman who had just been admitted to the skin ward (second case). The tissue was hardened, sections cut and stained and report was made that the sections showed acid-fast bacilli and were quite comparable in other respects with sections of tissue removed from typical cases of leprosy.

This report necessitates further study of the case because clinically it was decidedly not one which would

be diagnosed as leprosy. With Dr. White's cooperation portions of tissue from various parts of the body were examined and culture experiments and animal inoculations were undertaken. The results of these investigations were as follows:

Aërobic and anaërobic cultures were made on various kinds of media, as well as on egg medium and other media suitable for the growth of the tubercle bacillus. Cultures were also made in neutral 2 per cent. glucose agar. In this medium an Italian investigator (Campana) recently claims to have been able to obtain a growth of the lepra bacillus.

The tissue material planted in the various kinds of media was obtained under aseptic precautions and the cultures were made by Dr. J. H. Wright. Portions of the tissues used for inoculation of the culture media were hardened and stained and on examination the sections all showed numerous acid-fast bacilli, thus demonstrating the presence of the bacilli in the tissues used for the inoculation purposes.

The various cultures were under observation over a long period of time, but no growth was ever obtained. Other portions of the tissue material used for culture inoculation were placed in the subcutaneous tissues of a large normal guinea-pig and the skin wound closed with sutures. The pig never showed any signs of infection after the inoculation and was allowed to live fifty-seven days, when it was killed. The autopsy showed a normal animal and it was with difficulty that the scar of the inoculation wound could be made out. The inoculation material had apparently been absorbed.

The question of syphilis having been raised, sections from various situations were hardened and stained by the silver salt method, but no spirochetes were ever found.

Many portions of tissue were taken at different times from widely distant parts of the body, and finally a minute piece was excised from the mucous membrane of the nose. The sections from these tissues all showed more or less well-marked chronic inflammatory and degenerative changes, with varying numbers of the so-called lepra cells and acid-fast bacilli. In instances the lepra cells were very numerous and acid-fast bacilli swarmed in these cells and in the subcutaneous tissues.

Dr. White has recorded the histologic details of many of the sections, and I have only to call attention again to a few of the more interesting points.

The presence of the acid-fast bacilli in the cells of the epithelium is well shown in some of the sections, and the so-called lepra cells are notable both for the great variation in their size and for the great numbers of bacilli which they contain. In instances these lepra cells are not unlike giant cells and many of them present a vacuolated appearance. As to what these cells are it is difficult to say, but from their situation in the tissues and their relation to the lymph spaces it is probable that they are endothelial in origin.

In regard to the presence of the bacilli in the cells of the epithelium, it may be said that they have probably reached these cells by way of the lymph stream and possibly some of them may have been carried by leucocytes. In certain sections it is interesting to note the persistence of the bacilli in the subcutaneous tissues beneath the epithelium of one of the healed ulcers. Outwardly the lesion has run its course and is healed, but the section shows the bacilli resting in the subcutaneous tissue biding their time.

It is of interest that only late in the history of the observation of this case were acid-fast bacilli found in the nasal secretion, which, to say the least, is unusual.

The bacilli themselves require but little comment. They are acid-fast, but not so much so as the tubercle bacillus, which they resemble morphologically, and they stain well enough by Gram's method. The slight variation in their morphology is of assistance in ruling out the tubercle bacillus and making it probable that we have to do with the lepra bacillus. We failed completely in our attempts to grow them and they produced no effect whatever on the inoculated guinea-pig.

The pathologic examination of the lesions in this case thus shows both histologically and bacteriologically that these lesions are in all respects comparable with and like similar lesions in individuals who clinically are undoubted lepers. The histologic character of the lesions and the biologic character of the bacillus present in them are also in harmony with those first described as present in leprosy by Hansen in 1871 and since then confirmed and amplified by many investigators.

It remains to be said that recently this unfortunate young woman whose case we have here recorded was sent back by the state to Courland, Russia, as a leper.

I am indebted to Dr. White and Dr. Bowen for much kind cooperation and assistance in the study of the case, and I also am under obligations to Dr. Oliver, house officer in the skin ward, for much assistance during the investigations of this case.

ABSTRACT OF DISCUSSION

DR. JOHN A. FORDYCE, New York: This carefully reported case illustrates the resemblance between the various forms of the infective granulomata. The more we study the cutaneous manifestations of tuberculosis the more we appreciate their similarity to the syphilides, and the same is true of leprosy. Some of the tuberculides, too, are very similar to papulopustular syphilitic lesions. I recall a case of leprosy in which the lesions responded to hypodermic injections of mercury in very much the same way as in Dr. White's case. A man from South America came to the City Hospital with pigmentations on the skin; these had been the sites of infiltration which had disappeared under injections of mercury, and the diagnosis of this case was difficult until the subsequent development of other lesions took place, rendering the real nature of the affection fairly clear.

Another case which recently came to the notice of the Health Department of the City of New York was regarded by the health authorities and by several dermatologists as one of multiple sarcoma. The patient, a man from Courland, had purplish lesions about the ankles identical with those described in Kaposi's hemorrhagic sarcoma. One of these was excised and examined by two expert pathologists, who pronounced it sarcoma, but they failed to look for the lepra bacillus, which was subsequently found in enormous numbers.

Multiplying Words Without Knowledge?—In the Harveian oration, Dr. J. A. Omerod (*Lancet*, London, Oct. 24, 1908, p. 1202) says: "Thus it has been supposed on the analogy of other facts, that hemophilia is a character which becomes dominant or recessive according as the sex of the person is male or female, and that this accounts for the rarity of female bleeders."

Cf. Molière: *Le Malade Imaginaire:* Intermède.

Primus Doctor: Domandabo causam et rationem quare opium facit dormire.

Bachelierus: Quia est in eo virtus dormitiva. Etc.

Another illustration of this was found in a manuscript recently submitted to THE JOURNAL for publication, at the close of which the author enumerated the advantages of his method, and gave as the first advantage: "1. Its marked superiority over any other method.'

THE HYGIENE OF TUBERCULOSIS *

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The widespread sanatorium movement has demonstrated the fact that tuberculosis can be arrested in any climatic zone. This, however, should not lead us to ignore valuable scientific facts relative to the influence of certain well-known climates in the arrest of consumption.

As Hippocrates has well said: "Whoever desires to understand medicine thoroughly can by no means neglect the study of the seasons with their variations of the winds, both as to heat and cold, and those peculiar to certain regions."

As the able surgeon knows well his anatomy, so the physician should acquaint himself with meteorologic facts and climatic data relative to well-known health resorts. In climatology there are fundamental principles, a knowledge of which would be of great value to every physician.

The contributions of such men as Solly, Dennison, Vivenat, Copeland and Lombard have been of decided value and a stimulus to others for further research and investigation in this important subject.

3. The preservative quality of light, as might be expected, is more powerful in the direct solar rays, but it can be demonstrated to exist in ordinary diffused daylight.

As for sun heat, Solly says:

Its direct physiologic effects are to increase growth, to lessen the amount of food needed, and to diminish muscular force; the important indirect effects of sun heat are to induce patients to live more out-of-door lives and to keep doors and windows open.

In the Philippine Islands, 15 degrees north of the equator, sunlight and sun heat do not exert any untoward influence on the native population. Dr. D. A. Appel, of the Army Medical Corps, has recently informed me that his observation in the Philippines lead him to believe that tuberculosis is not as prevalent there as it is in our large cities; the poorer classes live mostly in shacks in which ventilation can not be prevented, even where the doors and window shutters are closed.

Atmospheric clearness and transparency, the so-called diathermancy, is a test of purity. Dennison, in his Colorado observations of 1876, proved that it steadily increases with elevation by consecutive thermometric observations of the sun's influence at different heights, and near sea level, and under conditions calculated to exclude radiation.

The increasing purity of the atmosphere, the absence of dust and smoke, or of moisture, with its attendant infusoria is a decided feature of elevation.

TABLE SHOWING CLIMATIC CHARACTERISTICS OF VARIOUS LOCATIONS

	Elevation.	Latitude.	Soil.	Temperature.			Humidity.	Cloudy days.
				Annual	Dec.	Aug.	Rainfall.	
Santa Fe, N. M.	7,000	33.34	Sand and Adobe	51	32	71	16.1	52
Colorado Springs	6,000	38.51	Gravel	47	28	70	15.2	58
Denver, Colo.	5,280	38.76	Gravel and Sand	49	29	76	14.1	63
Flagstaff, Ariz.	6,300	34.26	Gravel and Sand	53	33	74	16.0	51
Oracle, Ariz.	4,650	32.50	Gravel and Adobe	60	44	82	17.7	—
Las Cruces, N. M.	3,850	32.17	Adobe	59	46	77	7.2	18
Tucson, Ariz.	2,300	32.14	Sand and Gravel	69	50	83	12.0	57
Phœnix, Ariz.	1,100	32.28	Adobe	70	52	90	9.0	52
Yuma, Ariz.	130	32.44	Sand	72	56	96	3.1	18

Most men, I believe, recognize as ideal for the tuberculous that climate possessing the greatest possible amount of sunshine, a pure, dry atmosphere, light winds and porous soil, with elevation sufficient to increase the respiratory act in depth and vigor. All students of climatology recognize the germ-destroying power of sunlight, its power to destroy anaërobic bacteria; the use of the blue, violet and ultra-violet rays of light is an argument as to the value of sunlight in the arrest of tuberculosis. The mental effects of sunshine can not be overlooked, such as the promotion of cheerfulness of disposition and repose of mind in those compelled to live an out-of-door life. Solar light reddens the blood and cures chlorosis in the same manner as it restores the color to plants bleached in darkness.

Downs and Blunt, in 1877, reported to the Royal Society of London the results of their experiments relating to light, as follows:

1. It is inimical to the development of bacteria and the microscopic fungi associated with putrefaction and decay; its action on the latter organisms being apparently less rapid than on the former.

2. Under favorable conditions it wholly prevents that development, but under less favorable it may only retard.

Tyndal has shown that each higher successive stratum contains less and less of infusoria. Mequel of Paris found that with rise in elevation the number of bacteria in 10 cm. space was reduced from 5,500 in the Rue de Rivoli, Paris, and 7,600 in the park of Montisuris, near by, to 600, 85 and 8 respectively in a hotel at Thunet, 560 meters elevation, near Paris, while at 2,000 to 4,000 meters high there were none. Purity, therefore, goes with dryness, coldness and rarefaction of the air incident to elevation. Individuals arriving at a high altitude of approximately a mile above the sea experience an increase in both depth and frequency of respiration; after acclimatization there is a fall in the frequency of respiration, but the breathing continues deep. Spirometric records prove this fact; also, the increased size of the chest in both adults and children.

Time will not permit of an exhaustive consideration of this subject; elevation above the sea, dryness of the air, sunshine, winds, variability of the air temperature, electricity of the atmosphere, are all attributes of climate, and contributing factors in the arrest of tuberculosis. Colorado, northern New Mexico and northern Arizona are illustrative of the high altitudes, while Las Cruces, New Mexico, and El Paso, Texas, furnish a

* Read in the Section on Hygiene and Sanitary Science of the American Medical Association, at the Fifty-ninth Annual Session, held at Chicago, June, 1908.

moderate altitude. Tucson, Arizona, Phoenix, Arizona, and Yuma are comparatively low. The accompanying table of elevation, soil and latitude is appended for reference. I quote from the editorial in *American Medicine,* November, 1907, soon after the publication, in the *New York Dietetic and Hygienic Gazette,* of my article on this same subject:

> And what can be said of Dr. Clarence L. Wheaton of Chicago, who says that the ideal climate would be the one possessing the greatest possible amount of sunshine when he should know that for a third of a century there has been obtained the best results in the world in the Adirondacks, which are noted for the absence of sunshine, and if he really exposes his patients to what is now known to be harmful to them, we commend his cases to the trustees of that institution.

We have here evidence of commendable loyalty to the home climate, but it is seemingly unwise to attribute "the best results" in the world to a given health resort; the physician endeavoring to substantiate such a claim would meet with tremendous opposition from all quarters. As for sunlight or even sun heat being harmful to tuberculous patients when properly utilized, the facts herewith presented speak for themselves, no contributions to the literature covering this subject, either by climatologists or phthisiotherapists, have been presented, so far as I am aware, denying the effects here attributed to the sun's influence. The government has established at great expense in Colorado and New Mexico sanatoria for the treatment of tuberculous soldiers and sailors. These respective climatic zones approach our ideal in the choice of a climate, and the untoward effects of sunlight have not as yet been reported.

To one enlisted in the antituberculosis crusade in a great city like Chicago the study of climatology is of interest and value from a scientific standpoint alone; the rôle it plays here in the solution of the tuberculosis problem is an insignificant one.

The chain of dispensaries established by the Chicago Tuberculosis Institute and their affiliation with regularly organized relief and aid societies will eventually solve the medical and sociologic problem as it is presented to the worker here. The state sanatorium will in time be constructed and enable us properly to utilize the home climate in arresting tuberculosis. The results of the sanatorium treatment in so-called unfavorable climates has far exceeded our expectations. Let us be frank to admit that some climates are better than others; that they possess certain attributes exerting a decided beneficial influence in pulmonary disease; but with all our knowledge of these facts we must know that most of those afflicted should avail themselves of the home environment, for the end of the bow of promise for the average traveling consumptive rests on the mystic shores of the spirit land.

My long residence in Colorado and study of climatic conditions throughout the southwest have convinced me that often without regard to the circumstances of the patient or stage of his disease, it has been the custom to prescribe change of climate. Nothing can be more cruel or irrational than this; in the case of those too poor to afford the expense incident to a change, it opens the door to regrets which are likely to harass the mind when it most requires repose. In most instances the disease progresses more rapidly to a fatal termination, and in many cases the expatriated invalid finds not only a foreign climate but a foreign grave.

There are hundreds of human wrecks scattered over the desert waste of the great southwest, and thousands wandering in the mountain wilderness of some distant state, struggling for the mere necessities of life, with death an inexorable companion, and all the future dimmed by the shadow of waiting Charon.

Our knowledge of these facts must impress on us all the responsibility we assume in prescribing change of climate, yet let us recognize the fact that in selected cases climate is not all fallacy, and that it plays its rôle in the hygiene of tuberculosis.

39 Pine Grove Ave.

THE CONJUNCTIVAL TUBERCULIN REACTION AS A MEANS OF DIAGNOSIS AND CONTROL*

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AND

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It should be plainly stated and clearly understood that tuberculin tests of whatever nature are but confirmatory evidence for the substantiation of clinical findings. A large proportion of cases of pulmonary tuberculosis are capable of being diagnosed by the practitioner from examination of the local focus and consideration of the clinical history. In these cases fever, emaciation, cough with sputum more or less characteristic, and consolidation or destruction of lung tissue are sufficient evidence. These cases, however, form the long list of incurables, and diagnosis has its main importance in so far as it affects prophylaxis. It is in incipient or early involvements that the greatest amount of effort should be exerted toward diagnosis, because these patients are to a large extent curable, and cure means the ridding a community of a class of persons inimical to public health and public economy. These incipient cases of tuberculosis frequently present many elements of doubt as to diagnosis even after the most thorough physical scrutiny. If they are not tuberculous it is a great injustice to ostracise them; if they are tuberculous it is beneficial both to the patients themselves and their fellows that they be treated as such. It is in this class of patients particularly that diagnostic tuberculin tests are warranted. The choice of test to be applied depends on a variety of circumstances and conditions.

It will be granted that whatever tuberculin test is used must be convenient, rapid in execution and manifestation, inexpensive, harmless and dependable before it can be recommended for general use for the examination of one or of many hundred patients. By convenient we must understand tests which are readily submitted to and easily and accurately followed. The rapidity of execution and manifestation of the reaction are points of weighty moment when many people are to be tested in a comparatively short time or when the patient happens to be the support of a family or the manager of a business. In the examination of school children, candidates for life insurance, for the army or the navy, in the routine inspection of factories or lodging-houses, etc., where the expense is borne by municipalities or by private individ-

*Read in the Section on Hygiene and Sanitary Science of the American Medical Association, at the Fifty-ninth Annual Session, held at Chicago, June, 1908.

uals, the cost of material for the tuberculin test is frequently a prime cause of its not being used. All tuberculin tests must be harmless to the great majority, else this fact will doubtless be strongly urged against their use by unwilling subjects, imperfectly trained physicians or misinformed officials. As a consequence, both prophylaxis and cure will be interfered with. Inasmuch as tuberculin tests are to be taken as confirmatory evidence —evidence which is frequently final and crucial—then it goes without saying that such tests must be dependable

The conjunctival tuberculin test, as directed to be practiced by Calmette and others, is admittedly the most convenient, rapid and inexpensive means of administering tuberculin for diagnostic purposes. It is impossible to conceive of a maneuver more simple than the instillation of a drop of a non-irritating solution into the conjunctival sac and then in the main merely watching for the appearance of evidences of conjunctivitis in the instilled eye. The rapidity of execution and manifestation of positive reactions make this method ideal when large numbers of patients are to be tested and when time and assistance are limited. The chief objections that have been urged against its employment are that it is not altogether harmless and that there is question as to its dependability. It is with these questions that we shall principally concern ourselves.

A. CONSIDERATION OF THE SAFETY OF THE CONJUNCTIVAL TEST

Harmlessness of Tuberculin Tests in General.—The application of any tuberculin test is essentially the introduction into an organism of a substance which is foreign to it. This foreign substance is in effect a poison, whether it be introduced by the subcutaneous, the cutaneous, the inunction, the rhinologic, the pharyngeal or the conjunctival routes. The manifestation of the body's defensive powers constitutes the tuberculin reaction, modified for the form of application of the test. It may be stated, then, that improperly controlled, whether as regards, amount, time, class of patient or method of application, all tuberculin tests are capable of producing harmful results. This was early shown by Virchow[1] and others respecting the subcutaneous injection of Koch's "old tuberculin," and more recently by Trudeau and Baldwin[2] and Thelling[3] for the Koch's "new tuberculin." Pick[4] has lately mentioned the finding of fragments of tubercle bacilli in preparations of "old tuberculin *Hochst,*" used in the cutaneous reaction of v. Pirquet, and has found that the lesions produced as a result of positive manifestation of the reaction are in many ways similar to tubercles in parts of the body actively infected with the tubercle bacillus. In respect to the conjunctival reaction, attention has been frequently called to inconveniences and actual disability of the ocular apparatus which may follow indiscriminate instillations.

The harmful results from the use of the conjunctival test have mainly followed (a) when tuberculin was instilled into eyes which were not altogether normal, (b) when the patients were not kept under observation but were allowed to become exposed to dirt, mechanical irritants and infection, or (c) when unsuitable preparations of tuberculin were used. Calmette[5, 6] reports 1,000 personal observations and 13,000 instillations performed by workers other than himself, and states that in no case in which the tests were properly applied and controlled were there serious complications. Petit[7] tabulated 2,974 instillations with no ill effects out of 698 positive reactions. Mantoux[8] mentions no eye injury from instillation of 200 children. Ausset,[9] commenting on 300 tests also in children, speaks of but one case in which the positive reaction was the cause of any considerable inconvenience. In this child there was a prolonged conjunctivitis following the instillation. He believes that rubbing the eye and secondary infection were responsible for the condition. Etienne[10] tabulates no harmful consequences following the instillation in about 100 old men. In the routine examination of soldiers Simonin[11] records one case of kerato-conjunctivitis which he is inclined to consider as evidence of secondary infection. Citron[12] reports no unfavorable results from instillation in 115 cases in which the instillations had been carefully made and the patients watched. In 54 typhoid patients who were instilled with tuberculin, out of 20 positive reactions Cohn[12] noted no harmful consequences. Fritz-Levy,[13] after 300 instillations, considers the procedure safe when properly carried out. Lignieres[14] observed no ill effects following 200 instillations in cattle. Denis[15] calls attention to the fact that there were no harmful results in his cases even when the subjects were febrile. Levy[16] speaks of no eye complications in 120 instillations. Blum[17] instilled 240 patients, all ages, tuberculous and non-tuberculous, without harmful results. Schroeder and Kaufmann,[18] after 125 instillations, claim that when the eyes are examined before the instillation there is no danger of harmful results. Damask[19] instilled 74 patients, with no injurious effects; Morelli[20] tabulates 276 cases, tuberculous and non-tuberculous, but reports no permanent inconvenience to the eyes. In 220 cases Levi[21] cites two severe reactions: one in an old case of carcinoma with cachexia and the other in a patient with old tuberculous cervical glands. The latter patient had rubbed his eyes. Wolff,[22] from 101 observations, mentions two cases in which severe conjunctivitis followed, but fails to make mention of the eye examinations preceding the instillations. Stadelmann[23] reports no severe reactions following instillations in eyes which were negative before instillation. Of 100 cases Gaupp[24] noted no severe reactions. Of 310 instillations in tuberculous and non-tuberculous patients Cohn[25] mentions no serious ocular disturbances. In our own experience,[26] working with 1 per cent. solutions in normal salt solution, of more than 450 instillations in 377 individuals we have observed but four prolonged or stubborn reactions. These were: a case of splenomyelogenous leuke-

1. McFarland: Pathogenic Bacteria, 1906, p. 335.
2. Med. News, Aug. 28, 1907.
3. Centralbl. f. Bakteriol., July 5, 1902, p. 28.
4. Pick: Semaine médicale, Jan. 29, 1908, p. 59.
5. Calmette: Semaine méd., Jan. 22, 1908, p. 46.
6. Progrès méd., Feb. 22, 1908, p. 97.
7. Petit (quoted by Ausset): Rev. de méd., April 10, 1908.
8. Mantoux: Rev. de la Tuberc., February, 1908.
9. Ausset: Rev. de méd., April 10, 1908.
10. Etienne: Rev. méd. de l'est, April 1, 1908.
11. Simonin: Semaine méd., No. 48, 1907, p. 575.
12. Citron: Deutsch. med. Wchnschr., 1908, No. 8, p. 316.
13. Fritz-Levy: Deutsch. med. Wchnschr., 1908, No. 3, p. 194.
14. Lignières: Semaine méd., Dec. 4, 1907, p. 586.
15. Denis: Soc. clin. d. hôp. de Bruxelles, Province med., July 13, 1907.
16. Semaine méd., Feb. 12, 1908, p. 84.
17. Blum: München. med. Wchnschr., Jan. 14, 1908, p. 60.
18. Schroeder and Kaufmann: München. med. Wchnschr., Jan. 14, 1908, p. 62.
19. Damask: Wien. klin. Wchnschr., 1908, No. 4, p. 121.
20. Morelli: Wien. klin. Wchnschr., 1908, No. 3, p. 83.
21. Levi: Berl. klin. Wchnschr., Feb. 3, 1908, p. 261.
22. Wolff: Berl. klin. Wchnschr., 1908, No. 6, p. 295.
23. Stadelmann: Deutsch. med. Wchnschr., 1908, No. 7, p. 271.
24. Gaupp: Deutsch. med. Wchnschr., 1908, No. 7, p. 275.
25. Cohn: Berl. klin. Wchnschr., Nov. 25, 1907, p. 1507.
26. Smithies and Walker: THE JOURNAL A. M. A., Jan. 25, 1908, l. 259 and herewith.

mia, with old, postoperative cervical glands, leukemic retinitis and iritis with many adhesions; one case of old syphilitic keratitis, with history of early involvement of the cervical glands (before the patient contracted lues); one case of chronic Bright's disease associated with a high degree of arteriosclerosis, marked sclerotic fundus changes and increased intraocular tension; one case of long-standing arthritis deformans with apical tuberculous involvement, who responded to the conjunctival test after a subcutaneous injection of 1 mg. T. A.

Unfavorable evidence against the conjunctival reactions is scant when one eliminates that associated with cases in which patients presented eye changes before reaction came on. It is possible to conceive how in the course of instillation of many eyes even superficial lesions may be overlooked. It is certain that the way the conjunctival test is practiced in many large hospitals and dispensaries, in this and other countries, there is abundant opportunity for such lesions as iritis, keratitis, corneal ulcer, ocular tuberculosis and affections of the vitreous and fundus to escape notice.

After instillation, when people are allowed to go about their ordinary duties with the eyes unprotected, it is not unlikely that positive reactions can be aggravated and prolonged by mechanical irritants. In both children and adults rubbing the eyes has been shown to influence the severity and the duration of the reaction (Ausset,[9] Citron,[12] Calmette,[6] Wolff-Eisner[27, 28, 29] Levi,[21] the authors[26] and others). In hospitals, barracks, schools or neighborhoods where contagious ophthalmias are prevalent a positive conjunctival test may readily furnish a point of least resistance for the beginning of a specific infectious process, as suggested by Citron.[12] Variations in strength and character of tuberculin instilled appear to be responsible for a certain proportion of severe positive reactions and possibly for reaction in people not tuberculous. Solutions of old tuberculin varying in strength from 1 to 10 per cent. have been used, and of the precipitated, dried residue in solution, strengths of from 0.1 to 4 per cent. have been suggested. Preservatives, as glycerin and carbolic acid, have been variously added. One rarely finds mention of whether human, bovine or mixed cultures have been used. The solvents have been either normal salt solution or sterile, distilled water. Frequently the strength of solution has not been varied between children and adults; often many instillations have been made into the same eye at short intervals; the stage of the disease has received little study from most writers. It is not to be wondered at that unlooked-for consequences have sometimes followed.

A few writers have noted general harmful effects, as distinct from local eye changes. Occasionally severe facial neuralgia and headaches have been reported (Demarest and Arloing[30] and authors[26]). Febrile changes have been observed in a few instances (Demarest and Arloing,[30] Wolff,[22] Treupel[31] and others). In no case, however, were the general symptoms so marked as in a characteristic subcutaneous tuberculin reaction.

B. CONSIDERATION OF THE DEPENDABILITY OF THE CONJUNCTIVAL REACTION

1. *Necessity for Proper Technic.*—We have before[26] called attention to the mistakes which may follow careless instillation or the failure to make sure that the tuberculin instilled is not washed out by tears, wiped out or washed out intentionally after the physician has left. We have not thought best to instill into the inner canthus, as suggested by certain French and German writers (Calmette,[32] Wolff-Eisner[27] and others), but have preferred to hold the lower lid away from the eyeball, and while the patient's head is tilted back and eyeball turned upward we instill the drop into the inferior cul-de-sac. The lid is gently moved over the eyeball a few times, the lids are approximated for a few moments, the patient being directed to rotate the eyeball several times. Both before and after instillation all parts of both conjunctivæ, caruncles and semilunar folds are compared while the eyeballs are rotated in all directions. Abnormalities are noted in writing. Examination after instillation should be made frequently after the third hour.

2. *Consideration of Preparation.*—Our former work was done with 1 per cent. solution (?) of tuberculin prepared according to the formula of Calmette. Our results were in accord with those published by the majority of French writers. The preparation used was demonstrated to contain fragments of bacilli. The tuberculin was said by the manufacturers to be made from virulent, human and bovine cultures of the tubercle bacillus grown on 5 per cent. glycerin bouillon. Inasmuch as later it appeared desirable to the manufacturers to put forth a product absolutely free from tubercle bacilli, a process of extra purification was introduced. With the ordinary microscope this could not be said to contain any fragmented cells. It is not impossible, however, that they may have been revealed by the ultra-microscope, as suggested by Pick.[4] This second lot of tuberculin, which was supplied us in tablet form, was not dependable. The reactions were poorly manifested and the percentage of positive reactions was considerably lower for all classes of tuberculosis than had been given by our early preparation. We were able to establish this fact by comparative tests, fortunately having preserved some of the first samples submitted to us. Our results agreed in the main with those of other clinics where the second lot of tuberculin had been used in comparison with the first. The reason for this discrepancy involves considerable detail. Suffice it to say that, as shown by Detre[33] and T. Smith[34] too much precipitation and heating with hot alcohol, and the use of bovine tubercle bacillus cultures, or material derived from a mixture of bovine and human tubercle bacilli, might reasonably be expected to account for some of the differences noted. A proper preparation should be entirely from human tubercle bacillus growths, from virulent cultures grown on a proper medium. In the consideration of statistics from various sources it is absolutely essential that one know with what preparation the tests were made. The tendency in Germany appears to use solutions of from 0.25 to 4 per cent. "old tuberculin *Höchst.*" The French observers mainly follow the originally marketed preparation of dried, precipitated tuberculin in from 1 to 2 per cent. strength. Distilled water or physiologic salt solution are used as solvents. It has been clearly pointed out by many observers, notably Schmidt,[35] Citron,[12] and Damask,[19] that severe

27. Wolff-Eisner: Berl. klin. Wchnschr., 1907, No. 22.
28. Wolff-Eisner: Beitr. z. klin. d. Tuberk., 1908, ix, 1-189.
29. Stadelmann and Wolff-Eisner: Deutsch. med. Wchnschr., 1908, No. 5, p. 181.
30. Province méd. Oct. 12, 1907.
31. Treupel: München. med Wchnschr., Jan. 14, 1908, p. 66.
32. Calmette: Rev. internat. de la Tuberc., xiii, No. 2, 1898, p. 119.
33. Detre: Wien. klin. Wchnschr., Feb. 6, 1908, p. 173.
34. Smith: Jour. Exper. Med., 1898, p. 451.
35. Schmidt: München. med. Wchnschr., Jan. 14, 1908, p. 66. (Breslau cases.)

conjunctival reactions may be brought on by the use of 1 per cent. dried "tuberculin *Hochst,*" whether glycerin mixed or free, and that 0.1 per cent. strength is sufficient to bring about results corresponding to the preparation of 1 per cent. strength sent out from the Pasteur Institute at Lille. It has been well shown also by Damask[19] that the Pasteur Institute preparation is at least two and one-half times as effective as is the 1 per cent. solution of "old tuberculin *Hochst.*" It thus appears that when possible tuberculin prepared according to Calmette's originally described method is the most reliable. The variations in the results stated with the use of other preparations may also have been influenced by the variation in virulence of the growths from which the tuberculin was derived, the use of bovine cultures in the attempt to bring about reaction in humans, the use of bacilli grown on improper media, and the classes of cases in which each of the various forms of tuberculin was used. It will be readily understood how difficult it is to review statistics of reported work when such work has been done under so great a variety of conditions. It seems proper to compare separately the results from German and from French clinics.

3. *Results in Cases Known to Be Tuberculous.*—A summary of 1,554 cases of tuberculosis, all stages, from the reports of German observers (Fritz-Levy,[13] Daus,[36] Levy,[16] Blum,[17] Cohn,[25] Morelli[20] and Gaupp[24] reveals positive conjunctival response in 86 per cent.

Of more than 14,800 French cases tabulated from the writings of Mantaux,[8] Petit,[7] Ausset,[9] Comby,[37] Calmette[38, 6] and others, positive evidence was given in 93 per cent.

In our own experience 15 cases of incipient pulmonary tuberculosis were all positive, of 20 cases of bone tuberculosis 80 per cent. were positive. In 74 cases of moderately advanced pulmonary tuberculosis positive manifestations were secured in 75.6 per cent., with slight ocular changes in an additional 13 per cent. Of 42 cases of pulmonary tuberculosis, including moribund and miliary tuberculosis, positive reactions were secured in 59.5 per cent., with suspicious eye changes in an additional 15 per cent. In summary, of 151 cases of known tuberculosis, all stages, positive manifestations were secured in more than 79 per cent. In incipient and early cases positive manifestations were secured in 93 per cent.

4. *Presence of Reaction in Doubtful Cases.*—Of 476 cases in which tuberculosis was suspected, German statistics (Blum,[17] Schroeder and Stadelmann,[29] Morelli,[20] Levi,[21] Wolff[22] and Gaupp[24]) exhibit positive reactions in about 51 per cent.

With French writers the proportions are rather higher. Of 273 cases (Ausset,[9] Petit,[7] Grasset and Rimbaud,[39] Dufour[40]) 64.5 per cent. showed positive ocular manifestations. In Calmette's résumé of 14,000 cases he states that 61 per cent. of patients suspected of having tuberculosis gave distinct reactions.

In our own series, of 13 suspected tuberculous patients positive conjunctival changes were noted in 9, or in 69 per cent. It is possible that we secured a higher percentage of reactions than German or French writers because we were able to keep our cases under observation constantly from the time of instillation. Perhaps, however, were our series larger we should approach proportions similar to those of other workers.

5. *Presence of Reaction in People Apparently Well.*—Of 1,379 cases not clinically tuberculosis in the writings of German workers (Fritz-Levy,[13] Blum,[17] Schroeder and Kauffmann,[18] Morelli,[20] Levi,[21] and Cohn[21]) there were 9.9 per cent. positive conjunctival tests.

In Calmette's summary 18 per cent. of those not suspected of having tuberculosis gave positive manifestations. He suggests that this is in proportion to the gross percentage of tuberculous lesions found at autopsy. In Petit's[7] summary of 938 patients, many of whom were children, about the same percentage was obtained. He calls attention to the fact that many of his patients had adenoids and enlarged tonsils. Etienne,[10] working with old men, was able to secure positive conjunctival manifestations in 66 per cent., which he mentions is about the same proportion as Bruardell claims tuberculous lesions are found in the aged at autopsy.

Our own work shows that of 205 cases not clinically diagnosed as tuberculous 13 revealed positive ocular changes. This percentage, 6.8 per cent., is lower than that noted by other writers. Explanation might be found in the fact that many of our hospital patients were anemic, some were tested with poor tuberculin, and there were many young adults. Of 76 instillations in young men apparently well, but two gave positive ocular manifestations. In both of these there were fairly well marked signs of tuberculosis.

6. *Presence of Positive Conjunctival Reactions in Diseases Other than Clinical Tuberculosis.*—Much proof has been advanced to show that the conjunctival reactions are not specific for tuberculosis. The same sort of proof has long been held against all forms of tuberculin test, particularly the subcutaneous. It has long been maintained that patients affected with syphilis, leprosy and actinomycosis respond to the subcutaneous injections. Probably the same might have been noted had tuberculin been used subcutaneously in various acute infectious diseases, as typhoid fever, scarlet fever, articular rheumatism, etc. The contraindication to the use of the tuberculin may have been responsible for the lack of positive evidence. We have not been able to discover work in which negative evidence has been furnished. It has been urged by many that in typhoid fever, particularly, conjunctival tuberculin reactions may be obtained. The excellent work of Kraus, Lusenberger and Russ,[41] and the reports of Cohn[25] and Blum,[17] seem to furnish evidence that the occurrence of the reaction is not altogether accidental. The reaction appears to be most constant in convalescents. It is not always obtained, as shown in Levy's[15] cases. In one of Montagnon's[42] typhoid cases, in which the patient died, abundant evidences of tuberculosis were discovered. In our own series we failed to get positive evidence after two instillations in a case of typhoid in a young adult. A case of miliary tuberculosis suspected of being typhoid for some days gave positive conjunctival reaction after injection subcutaneously of 1 mg. of TA. Fortunately for clinicians and public health officers, incipient tuberculosis is rarely mistaken for typhoid. When the two exist together, then again one must emphasize the fact that all tuberculin tests are but confirmatory evidence. Several writers (Citron[12] and Blum[17]) call attention to

36. Daus (quoted by Fritz-Levy): Deutsch. med. Wchnschr., 1908, No. 3, p. 194.
37. Comby: Semaine méd. July 31, 1907, p. 271.
38. Calmette: Progrès méd., Jan. 25, 1908, p. 45.
39. Province méd., July 13, 1907.
40. Dufour: Societe Méd. hôpitaux, Semaine med., July 24, 1907, p. 358.
41. Kraus, Lusenberger and Russ: Wien klin. Wchnschr., 1907, No. 45, p. 1385.
42. Montagnon: Presse méd., July 20, 1907.

the fact that positive conjunctival reactions may be obtained in syphilitics and cases of acute articular rheumatism. Citron[12] suggests that the reaction may be due to old lesions that make themselves manifest as a result of the secondary change. Blum[17] has noted the reaction in nine cases of scarlatina, in eight cases of lobar pneumonia and in six of sepsis. He does not furnish evidence to show that in these cases it was possible to exclude tuberculosis, typhoid, syphilis or previous eye lesions.

The experiments of Arloing[43] have been frequently cited as indicating the non-specificity of the conjunctival test. In brief, they consisted in injecting subcutaneously into rabbits, supposedly non-tuberculous, successive doses of tuberculin, diphtheria toxin, typhotoxin and staphylotoxin. The eye reaction in all cases was found negative before the injections. After the eighth daily dose of toxins eye changes were noted in all classes of animals, particularly in those which had been injected with typhotoxin and tuberculin. The serum reactions of each remained negative during the entire list of tests. At postmortem no evidences of tuberculosis were discoverable in any of the animals. Criticism of this work might be freely offered. There were no control rabbits. The rabbits were not protected after instillation; reactions were not noted until after the eighth dose of subcutaneous toxin, or about at the tenth day, a proper period of sensitization. There were no rabbits injected at the same time with tuberculin subcutaneously, with note as to whether or not they developed fever reaction. A series of four rabbits is too small a number from which one may draw conclusions. Finally, clinically, there should be no difficulty in distinguishing between tuberculosis, typhoid fever, diphtheria or sepsis. De Lapersonne[44] calls attention to the fact that reaction similar to the conjunctival test may be produced after intoxication with abrine and serpent venom. Inasmuch as these occurrences are infrequent, the observation can have little practical value, although it has considerable scientific interest.

7. *Presence of Positive Conjunctival Reaction in Cases in Which Tuberculin Has Been Used Subcutaneously, Either for Diagnostic or Therapeutic Effect.*—This is a factor that has doubtless led to much confusion. If, after patients have received two subcutaneous injections of tuberculin, according to the method of Koch, at an interval of several days, without reaction, and then positive reaction is manifested when tuberculin is instilled on the conjunctiva, discredit is likely to be thrown on the method. The work of many writers (Dumarest and Arloing,[30] Baldwin,[45] Hutchins,[46] Fritz-Levy,[13] Cohn[25] Damask,[19] Stadelmann and Wolff-Eisner,[29] the authors[26] and others) demonstrate that in patients who have received two or more cutaneous injections for curative or diagnostic purposes conjunctival reactions may be produced, may be brought out after being negative, may be aggravated if already present, or may become again evident weeks after they have subsided. The patients who have been the longest under treatment with subcutaneous injections show a lower percentage of response, with frequently less pronounced reaction, than do those in whom there have been few, fairly large doses of tuberculin, subcutaneously (as when tuberculin is used diagnostically in ascending doses). Patients under treatment with tuberculin may, however, fail to react, as shown by Baldwin[45] and Schroeder and Kaufmann.[19] Cases of incipient tuberculosis show more prompt and vigorous responses than do middle or late stage cases (Damask[19]). Patients with tuberculosis frequently show violent reaction after subcutaneous injections when the tuberculin has been instilled in the same eye. Patients not tuberculous may exhibit conjunctival reaction after several injections of small doses of tuberculin subcutaneously (Cohn[25] and authors[26]). This is particularly so when the subcutaneous injections are continued at intervals after the tenth day. There is less response when the subcutaneous injections are small, as TR for therapeutic effect, than when the dose is fairly large, as TA for diagnosis.

8. *Comparison of Results Obtained with Conjunctival Tuberculin Tests and Various Other Tests.*—As yet there is little literature available on the inunction, the rhino-tuberculin[47] and the pharyngeal-tuberculin[48] tests, so they may be left out of consideration. Statistics compiled from many sources seem to point to the fact that, for greatest accuracy when the test can be carried out on hospital or sanitarium patients, the subcutaneous test is somewhat more reliable than cutaneous or conjunctival tests. Unfortunately, however, concerning the subcutaneous method statistics are usually quoted in regard to its diagnosis only of early or incipient cases, which are fever-free, whereas statistics are quoted for conjunctival and cutaneous tests from whole number of patients tested, be they incipient, moderately advanced or moribund cases. The subcutaneous method, for obvious reasons, has been little tried on apparently healthy persons. When it has, results have been not altogether favorable. (Franz obtained positive reactions in 61 per cent. of "able-bodied recruits" to the Bohemian army.) One can not conceive that all these were syphilitics, lepers, actinomycotics, trypsin or peptone poisoned individuals!

When the conjunctival, the cutaneous and the subcutaneous tests are compared as regards incipient or early stage cases, the percentages of positive reactions do not greatly vary, and, after all, this is the stage when tuberculin should be used. Calmette's statistics on 14,000[38] cases give the percentage of positive reactions with the conjunctival, early cases as 92 per cent. Schroeder and Kaufman[28] in 971 cases of tuberculosis as 88.5 per cent. In our own series the conjunctival reaction was positive in 93 per cent. of early and moderately advanced cases. It is difficult to get actual figures on the subcutaneous method. In but very few clinics, however, are percentages over 90 exceeded.[33, 34] It is not quite proven that repeated injections of tuberculin for diagnostic purposes are not capable of ultimately producing reaction in cases which are not tuberculous or where the lesions are very old and inactive. Especially does this seem so where from six to ten injections are made during a few weeks. The securing of reaction in incipient cases by the repeated injection of the same size dose, as shown by Hinman and Wolman,[49] is very significant. Doubtless hypersensitization may be thus produced quite as distinctly as with the conjunctival method. In respect to the relative merits of the cutaneous (v. Pirquet's) and the conjunctival tests, numerous comparisons are available.

43. Arloing: Prov. méd., Feb. 1, 1908, p. 54.
44. De Lapersonne: Presse méd., Dec. 7, 1907.
45. Baldwin: THE JOURNAL A. M. A., Dec. 14, 1908, xlix, p. 1969.
46. Hutchins: Therap. Gaz., Dec. 15, 1907.
47. Lafite, Dupont and Molinier: Jour. de méd. de Bordeaux, Feb. 16, 1908.
48. Plehn: Deutsch. med. Wchnschr., 1908, No. 8, p. 315.
49. Johns Hopkins Hosp. Bull., Aug. 1, 1907.

In 114 cases of tuberculosis, Morelli[20] obtained positive cutaneous reaction in 98 per cent. and positive eye changes in 86 per cent. He neglects to state which test was applied first. It is possible that the one exerted a perceptible sensitizing effect on the other. In cases of suspected tuberculosis, the v. Pirquet reaction was positive in 94 per cent., the conjunctival in 47 per cent. In 96 cases not clinically tuberculous, the cutaneous reaction was positive in 21 per cent. of the cases, the conjunctival in 11 per cent. The latter figure agrees rather closely with that obtained by other workers. There is a question as to whether or not secondary infection does not increase the percentage of positive reactions, so-called, to the v. Pirquet reaction. This appears to be particularly likely when dispensary patients are treated and then allowed to depart with the skin improperly protected. Several of Morelli's cases showed at autopsy old tuberculous processes when both conjunctival and cutaneous reactions had been negative. Wolff's[22] figures are slightly in favor of the skin test, especially for children. He has noted radiograph indications of infiltration when the cutaneous reaction was negative. Stadelmann[23] cites a case in which the cutaneous reaction was positive and the subcutaneous negative until injection of 5 mg. TA. He is inclined to think that the conjunctival test is valuable in early and suspected active cases, while better results may be obtained with the cutaneous test in quiescent lesions. He calls attention to the prognostic value of both reactions. Usually they both appear with severity in inverse ratio to the virulence of the infection. This severity is in direct proportion to the patient's protective powers. The instillation, application or the injection of tuberculin derived from bovine tubercle cultures might affect the results with the various tests, as suggested by Detre.[33] Wolff[22] states that in his experience the cutaneous and the conjunctival tests have shown very similar results. Other statistics might be cited.

In general, then, it may be stated that when properly applied and controlled the conjunctival tuberculin test shows results which compare favorably with those obtained by the subcutaneous and cutaneous methods. The facility with which this test may be applied and wider range of its usefulness speak strongly in its favor. It has been suggested that the subcutaneous injection might be used to supplement the conjunctival test (Citron,[12] Vallée,[50] Schroeder and Kaufmann,[18] Stadelmann,[23] Fritz-Levy[13] and others).

9. The Question of Interpretation of Positive and Negative Results.—This question is one which deserves attention. It appears that when the conjunctival reaction is prompt (typhoid, mechanical irritants in the eye, or irritant properties in the tuberculin instilled being excluded, and with the use of a suitable preparation in so far as strength, character of bacilli, etc., are concerned) there is good reason to consider that the patient is tuberculous. The test in these cases will doubtless be readily confirmed by local or general examination. A negative reaction in a suspected individual should not be taken to mean that the case is non-tuberculous. In doubtful reactions, cytologic examination for polynuclear leucocytes in the eye discharge may be made, as suggested by Lafite, Dupont and Molinier.[47] It is best, however, to make a second instillation after two days' interval in the eye not previously instilled. It is sometimes advisable to use stronger solutions at this instillation. (Eppenstein,[51] Fritz-Levy[13] and others). If this second instillation is negative after two or three days one may safely say that the patient is free from active tuberculous lesion. Reinstillation later into the first eye might be possible with the same strength solution as first used, but after five days there is strong probability that the second instillation may produce local hypersensitization and reaction in people not actively tuberculous, or a very severe reaction in cases tuberculous. In more than 100 instillations in moderately severe and moribund cases, we have never seen a case fail to respond to a second instillation of 1 per cent. solution in the same eye, when such instillation were made within three days. We have frequently noted that people not tuberculous clinically failed to show ocular changes, when from three to five instillations were made in the same eye within ten days. We have also reported instances[26] in which after the tenth and as late as the twentieth day repeated instillation of 1 per cent. freshly made solution failed to produce conjunctival changes in persons not clinically tuberculous. In moribund cases we have had negative reactions to one instillation made in eyes which had been instilled a month previously, but positive manifestations to second instillation made two days later in the same eye. We have also noted response to the second instillation made in the previously non-instilled eye.

The local anaphylaxis in tuberculous individuals may persist for weeks and even months. This has already been commented upon in the literature. We have noted a case in which conjunctival changes appeared spontaneously three times in an eye where rather severe reaction had followed the second instillation (made within four days). The case was one of old tuberculous hip-joint disease. During five months following the first instillations the patient had three attacks of night pains, tendernesss over the hip joint, with disability. Each time conjunctival changes appeared and lasted for from one to three days. The first spontaneous reaction was the most pronounced. These facts are significant. Patients should always be questioned regarding whether or not they have previously submitted to the conjunctival test, and if so, with what result. We have never seen, either in the literature or our own experience, a case in which prolonged sensitization was maintained in patients free from tuberculous taint.

In our work we have made an attempt to correlate the instillation time with respect to the clinical symptoms, especially with regard to the instillation in patients febrile and not febrile. In a few instances of early and moderately advanced pulmonary tuberculosis with fever, we have secured prompt and vigorous responses to the first instillation. But we have also noted reactions equally prompt and equally vigorous in patients who were afebrile. We have never, however, failed to secure prompt and well-pronounced response in febrile tuberculous patients, whereas in many cases of tuberculosis which were afebrile we have secured delayed and not well-marked conjunctival changes. This fact suggests that in incipient or early cases of pulmonary involvement better results could be expected from instillations made in the afternoon, when such patients are apt to have rises in temperature. The point requires more confirmation however.

It would appear from the foregoing discussion of the work of others and ourselves that the questions of the

50. Vallée: Progrès méd., Feb. 8, 1908, p. 69.

51. Eppenstein: München. med. Klin., Sept. 8, 1907.

harmlessness and the dependability of the conjunctival reaction to tuberculin were fairly well supported, and that as a method whereby confirmation of more or less extensive physical examinations is desired it has numerous advantages over other forms of tuberculin test. In the rapid examination of large numbers of cases, as for example, in the army and navy, public institutions, schools, manufacturing establishments, immigrants, etc., the method appears to be of great worth. It should be preceded or supplemented by local examination in all instances before final judgment can be given. It may be combined satisfactorily with the subcutaneous method when deemed necessary as the weight of evidence appears to be that these reactions reinforce each other.

In the routine examination of many individuals it appears desirable that a general scheme of work be followed out, that the best results may be obtained.

First: Accurate register of each patient tested should be kept in convenient form. A chart enables us to watch each patient thoroughly and furnishes a valuable lot of information for the subsequent study of cases and the reaction. On this chart is recorded the patient's name, age, sex, preparation of tuberculin used, eye in which it is instilled, date and time of instillation, reaction, including time beginning, degree and time ending, and whether slight, moderate, pronounced or very pronounced.

Second: A proper preparation must be insisted on. In all instances it should be freshly made—with sterile diluents — physiologic salt solution or water. That manufactured according to the original method of Calmette appears most desirable. It is conveniently marketed in 1 per cent. solution and in powdered form. We have always preferred to use sterile, physiologic salt solution as a diluent, and have found the 1 per cent. solution satisfactory. It might be advisable in picked cases, *e. g.,* children and febrile patients, to use the 0.5 per cent. solution. If preparations of "old tuberculin" are used, then solutions of various strengths might be prepared according to the method of Eppenstein[51] (1, 2 and 3 per cent.) or of Fritz-Levy[13] (0.5, 2 and 4 per cent.).

In children, and particularly in scrofulous patients, even weaker solutions than 0.5 per cent. may be used with satisfactory results. If a preparation of the "dried tuberculin *Hochst*" be used then 0.1 per cent. solution is amply strong. If stronger are employed severe and prolonged reaction, with perhaps serious damage to the eye may follow.

Third: Examination of the eyes for evidence of old or recent lesions.

Fourth: After instillation, the eye should be protected from rubbing, mechanical irritants, injury and secondary infection. This may be managed in adults by giving them simple directions; in children celluloid shields or eye-pads may be adjusted. Violent reactions can be appropriately treated by cold applications, mildly antiseptic eye washes, or washes containing astringents.

Fifth: Reinstillations should be made in the eye not first instilled, and if the preparation is from old tuberculin, the strength of the solution should be increased in order to obtain the best results. If instillations are made in the eye first instilled, then positive evidence is not possible after the fifth day. If instillations are made in the other eye positive evidence is doubtful after the tenth day.

CONCLUSIONS.

In the routine examination of many individuals tuberculosis is readily overlooked unless some form of tuberculin test is administered. These tests, however, are but confirmatory of physical findings.

The conjunctival tuberculin test as directed to be practiced by Calmette and others is convenient, rapid in application and manifestation, inexpensive, can be used in febrile cases, is practically harmless when properly carried out and controlled, and is, in the hands of the general practitioner, for incipient and early cases, as dependable as are any other forms of tuberculin test.

Proper technic, proper preparation, discrimination in the interpretation of both positive and negative reactions, and care of the patients following instillation are necessary for the success of the reaction.

Patients presenting disease of the eye other than simple conjunctivitis should not be instilled.

Second instillations should be made in the opposite eye. Positive reaction in this is dubious after the tenth day, if the suspected focus is not examined.

Care should be taken to eliminate recent typhoid, colon infections, syphilis and acute infections, as diphtheria, sepsis, scarlet fever and articular rheumatism. Patients receiving tuberculin subcutaneously for diagnostic or therapeutic purposes may be expected to react, frequently irrespective of active tuberculous foci.

Prompt, positive manifestation generally means an active focus with good systemic resistence. This is especially so in early cases. Delayed response, with feeble ocular changes, may be considered as of bad prognostic import in both early and late stages of the disease.

Severe conjunctival disturbances may result from reinstillation in the same eye, particularly in tuberculous individuals, and after the tenth day in others. Sensitization of the conjunctiva may persist for months and reinstillation may be responsible for violent reaction. This may be aggravated by synchronous or subsequent subcutaneous use of tuberculin.

In the preparation of this paper the writers are especially indebted to Dr. W. A. Evans, Commissioner of Health of Chicago, and to Drs. Wilhite, Moore and Farrand of the Cook County Institution at Dunning, Illinois, for access to material and for many courtesies. Drs. M. L. Cushman and C. Burnett rendered valuable service in the routine examination of patients at the University Hospital, Ann Arbor.

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EARLY DIAGNOSIS OF TUBERCULOSIS AS A MEASURE OF CONTROL,

ESPECIALLY THE RELATION OF TUBERCULIN THERETO *

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The Department of Health of Chicago began the registration of consumptives July, 1907. A rule was passed requiring it. At the time the number of available beds for consumptives was 325. These were for late cases. In addition the Tuberculosis Institute was maintaining a sanitarium for early cases. The capacity of that institution shortly after July was increased to twenty-six beds.

There are two tent colonies near the city. One, that of Drs. Pettit and Butterfield, was then in existence; that of the Homeopathic Medical Society was founded last year. The general hospitals were taking a few cases, generally without plain, straightforward acknowledgment of the fact, and lacking the better control which goes with candor.

The experiences of these institutions was that consumption was not being diagnosed early enough for successful handling. Occasionally a diagnosis was made when an arrest could be accomplished in less than five months. Rarely one was determined when an arrest in two or three months was possible. The usual favorable case, according to the opinion of the diagnostician, required from one to three years of expensive maintenance without any earning power during the interim. Returned to work with his disease arrested, his outlook was a life of diminished capacity for productive work with a high probability of recurrence of his disease.

Viewed strictly from the economic standpoint, it is doubtful if anything is gained by curing these two to three year cases. I have in mind one institution which has been confronted with a great dilemma, due to two factors: (1) The physicians in attendance are not diagnosing the disease until it has reached such a stage that more than two years are required for arrests; (2) the patients who constitute the clientele are not financially able to withstand the needed expense.

This, as you see, leaves another problem untouched—the late and dangerously contagious consumptive. Our provision for these patients is much more adequate than that in any other direction, as it is most immediately vital.

As a means to reporting, we adopted disinfection of premises previously occupied by tuberculous patients and the use of tuberculin. All such premises are disinfected and instructions for cleaning are given. The number of premises disinfected for tuberculosis since Jan. 1, 1908, is 1,268, with 6,673,500 cubic feet. It has been unopposed, except in two minor instances. We have given away more than 500 doses of tuberculin. Our *Bulletin* has carried seven notices as to early diagnosis and the use of tuberculin therein; 928 cases of living tuberculosis have been reported since Jan. 1, 1908. The newly established tuberculosis dispensaries, six in number, are valuable factors in the discovery of consumption.

The methods employed are three days' preliminary observation of pulse and temperature, at 8 a. m., 12 noon, and 8 p. m. Late in the evening of the third day 4 milligrams of old tuberculin are given hypodermically. The temperature and pulse observations are made every two hours during the next day. A rise in temperature to 101.5 F. + is held to be a reaction, when there is a rise of pulse of 15 beats, a general and local reaction. As soon as the reaction is definite, control of the neuralgias with phenacetin is advised.

We have also made use of the ophthalmic tuberculin test. We reserve judgment as to its value. We are now engaged in testing 1,500 cows with it, doing controls with the hypodermic method. We endeavored to determine that dose which would give clear-cut, definite reactions in those cases which were of some clinical importance. A larger dose would discover some cases with quite well encapsulated small lesions, oftentimes limited to the lymphatic glands. Many of these cases are of small clinical importance and should not be handled as one would a clinical case. A smaller dose would give reactions so mild that a man of considerable experience would be required to interpret them.

I have in mind now a case of very chronic pleural infection in which the other method of administration gave a result which was variously interpreted by many observers.

The method which begins with a progressively increasing dose is open to the objection that greater skill is required in interpreting the result, and the coefficient of certainty is lowered and the progressing immunity adds a factor of uncertainty. While there is not the same degree of immunity as veterinarians have noted with regard to the use of full doses, it is, in some degree, a factor. I know of no observations tending to prove that the principle of sensitizing has any bearing on the conditions which obtain in examinations for diagnosis.

The objection is that the patient is uncomfortable for twenty-four hours. The claim that there is danger will be discussed separately. The discomfort can be made slight with antineuralgics. In my experience, the patients have recognized that the proceeding meant too much to be obfuscated by minor considerations.

The second question is the danger. I have no evidence that leads me to believe that in this respect the minor dose method differs from the other. Therefore, the question of danger is the danger of the use of tuberculin for diagnostic purposes. The arguments for its danger may be divided into two groups, (1) the histologic and bacteriologic, and (2) the clinical. The first teaching, that of Virchow, was that miliary generalization of tuberculosis was due to degeneration of the granuloma tissue with discharge into the blood vessels. The proof now is quite conclusive, to my mind, that blood generalization is by thoracic duct transmission. Longcope and Whipple have proved this. The miliary diffusion so very frequent in tuberculosis is of this origin. Tuberculous intestinal ulcers were found in 89 out of 161 cases of pulmonary tuberculosis coming to autopsy at Cook County Hospital.

The observations of Weigert and Benda of the histology of tubercle in relation both to the new vessels of the tubercle and to the pre-existing blood vessels is proof about as conclusive as that of Longcope and Whipple.

The next theory is that when tuberculin is injected there is a lowering of the opsonic index. This presupposes that tubercle bacilli are being discharged into the blood lymph at some time during the period of

* Read in the Section on Hygiene and Sanitary Science of the American Medical Association, at the Fifty-ninth Annual Session, held at Chicago, June, 1908.

opsonic depression. There is no proof that such discharge is occurring so frequently that there is likelihood of its occurring at any given moment. So far as I know, however, there is no proof of such a spreading coincident with lowering of the opsonic index due to tuberculin.

It is difficult to weigh the clinical data. I have not yet read of a case in which there was a clear demonstration of cause and effect, or anything to prove or even indicate that the use of a single dose of 4 milligrams of tuberculin increased the incidence of generalizations. My autopsy experience, fairly large, has taught me that periodic partial bacillary diffusion is the rule in long continued phthisis.

In the Knopf case it is impossible to determine whether the result is coincidence or cause and effect. The Billings cases, two in number, belong in the same category. I have not been able to get the data in the Edwards and Greene cases. Letters to them elicited no more data than those given in their books and I am not able to draw a conclusion from them. Trudeau writes of a man who was to have been injected at a given time, but who had a generalization just before the proposed injection. He said: "Had the generalization followed the injection, it would have seemed an incontrovertible case."

My experience is limited to a moderate personal use extending over ten years, and a consulting relation in the hospital where it has been fairly frequently used for ten years. Results in 100 cases have been published. A second hundred cases have been studied. The Chicago Department of Health has publicly advocated its use for nearly a year, and 500 doses have been distributed. Probably in other capacities I have sent over 200 additional doses. I have heard of no ill effects in any of these cases. We are justified in concluding, therefore, that the incidence of dissemination is but low.

The certainty of the test needs no argument. The advisable dose in order to determine the limitation of discovery is a fair field for discussion.

The question now arises, do we need this means of diagnosis? This question should be asked, not of the most skilled specialists, but of the rank and file of the profession, those who are consulted before the patient has developed much of a symptomatology.

Consideration of history in the afebrile cases is of but little value in the hands of the inexperienced. Physical examination requires too much technical skill in the earlier cases for the average practitioner. Sputum examination does not reveal the disease when it is curable without great drain on the resources. Fever, rapid pulse, emaciation, sweats, are, of course, not to be considered in discussing early cases.

There is urgent need for a test easy of application, requiring no technical skill and not requiring much of experience to evaluate. With present methods for the next quarter of a century the average diagnosis will mean death after a prolonged illness.

Let us suppose, however, that there is some proof that bad results have followed the use of tuberculin for diagnostic purposes. The question next arises, is the frequency of diffusion and the degree of danger therefrom surpassed by the benefit to be derived. Diffusion is not a rare incident in consumption. It is the rule, or nearly so. Many of the resulting lesions are found cured at autopsy. The bearing of this is that diffusion, if it does result from tuberculin injection, is not as appalling as if it were otherwise unknown.

Weighing all of the factors, valuing the incidence of danger, on the one hand, and the increased curability and the decreased length of illness on the other—the possible harm, the probable gain, the weight of each—it is my judgment that no health officer with a conscience can fail to advocate the diagnostic use of tuberculin in the human subject.

A surgeon contemplating an appendectomy weighs the danger of the anesthetic and of the operation, he weighs the advantages. He acts on the balance of favor, one way or the other. Would his conscience allow him always to refuse operative procedure because there has been a rare case of death from anesthesia?

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ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. EVANS, WHEATON AND SMITHIES

DR. S. A. KNOPF, New York: It has been said here this morning that the man who does not use tuberculin in diagnosis of tuberculosis is a man without a conscience. I am guilty of not having used tuberculin or recommended its use, except once or twice as a therapeutic means in a case when there was neither progress nor the contrary. I have the consolation of believing that in opposing tuberculin when they used to give 15 to 20 mg., I have helped in some measure to reduce the quantity to the small doses now in use. My distinguished friend, Dr. Evans, said he used 4 mg. When he said that I heard some whispering to the effect that that was altogether too much. I believe that early physical diagnosis is more carefully and frequently practiced, because of the opposition to tuberculin as a means of early diagnosis. I believe that if every practitioner would feel that the simple injection of 1 or 2 mg. of tuberculin would surely reveal the presence of tuberculosis, it would do away with physical diagnosis. I believe that careful physical diagnosis is still very important and absolutely essential as a preliminary to any one of the three tuberculin tests. That the tuberculin test is not infallible, we all know; even the tuberculin enthusiasts will admit that, but since we have so many means of using tuberculin in small and consequently less dangerous doses, I am less opposed to it. Still, even with small doses we have had the reaction in actinomycosis and in syphilis and in pure chloranemia. The examination of the sputum was once thought to be the only means of diagnosing tuberculosis, but I do not agree with that statement. It is true that you must easily find tubercle bacilli when there is a large disintegration; nevertheless, if the bacilli are not found at the first examination, then attempts should be made the second, third, fourth and fifth time; I know Dr. Brown has found the bacilli on the twentieth trial. It is something I would not wish to neglect in favor of tuberculin tests. But, of course, it must not be forgotten that while the finding of the bacilli in the sputum proves beyond a doubt the presence of a tuberculous lesion, their absence in the sputum does not by any means exclude the presence of tuberculosis.

I was very glad that Dr. Wheaton brought out the value of sunlight, for a prominent scientific man has recently made the statement that sunlight produces tuberculosis, and that the ideal way to live would be in a dark room. It will be my privilege to reply to that theory next Saturday morning before the Society for the Study and Prevention of Tuberculosis. The ideal climate to my mind is one where the patient can live outdoors the largest number of days with the greatest amount of comfort, wherever that may be. There are idiosyncrasies in the susceptibility to climatic conditions as well as to medicine. If I am called on to decide the climate for a patient, I examine my patient to see what stage he has reached and whether he has money enough to sustain him away from home for a year; and then I ask him whether he prefers and feels best in cold or warm weather. I select

the climate in accordance with his preferences. The economic factor is most important. A patient who comes from the laboring classes should, as far as possible, be treated and cured in the climate where he contracted the disease. I firmly believe that the home climate of the patient, or a climate in or near the locality where he wishes to live after his restoration to health, is the ideal climate for him. It may take a little longer to cure a patient in his home climate, particularly if not ideal, but I believe that the chances of his remaining cured are better than if we had sent him to a so-called congenial climate entirely different from the one where he wishes to go back to work. If a patient is in an advanced stage, and I know he will not get well, I let him go away or stay at home, just as he likes.

Diagnosis should be begun in the schools. The Calmette or ocular test is excellent in many ways, but it is not free from danger, particularly in scrofulous children. It is necessary to be careful to avoid keratitis and other serious inflammatory troubles. Sometimes a child has been inoculated three or four times. The little ones forget that it has been done, and whether the test was made in the left eye or the right eye; and because of the sensitizing the diagnostic value is much lessened. I believe that we could accomplish a really great work in the early diagnosis of tuberculosis if we would train our school teachers to suspect tuberculosis when a child fails in its studies, looks anemic or complains of pain in the joints, and to refer such a child to the school physician for a careful examination. It is only by systematic examination and re-examination of suspected cases, that we shall find the children who are tuberculous. After a child has been declared to be tuberculous, it should be sent to an open-air school or school sanatorium. We must teach the child to love fresh air. When we begin by diagnosing tuberculosis in childhood and follow up the case so that the child will not develop full tuberculosis—you all know how curable tuberculosis is in childhood—then we shall strike at the root of the problem. Herein, I believe, lies one of the most important parts of our diagnostic work in regard to tuberculosis.

DR. VICTOR C. VAUGHAN, Ann Arbor, Mich.: In regard to the use of tuberculin, I am midway between Dr. Evans and Dr. Knopf. Some years ago, I was using it a little and then I declared that I would never use it again. Then I used it again for a while, and then I declared I would never use it again. I am there just now. I think I shall never use it again. Of course, there are various forms of tuberculin. Dr. Smithies emphasized the point that we should know what we are using when we use tuberculin. Tuberculin is generally prepared by concentrating a glycerin culture of the bacillus of tuberculosis. In some cases the so-called tuberculin is precipitated with alcohol and re-dissolved in water and re-precipitated, etc.; in some cases it is not. More or less of the tubercle bacillus has gone into the solution. It is a powerful mixture, and we now know certainly that a proteid substance injected into the human body or administered intravenously, subcutaneously, intracranially, intra-abdominally or anywhere except in the mouth, may act as a poison. If you give two injections of egg-white at intervals, you poison the subject. By giving tuberculin you render the subject susceptible to every proteid that is in the mixture. In the hypodermic use of tuberculin I think that we should be very careful and should know what it is. I am much interested in the Calmette reaction. I do not think that the time has come when we can accept it positively. There are a few cautions yet to be borne in mind in using it. We now know, what we did not know at first, that its repeated use in the same eye may bring on rather severe inflammation. I instilled tuberculin into the eyes of 108 or 110 supposedly healthy young men in my class. Six reacted. I concluded, after a physical examination and after taking the temperature, that four of those were tuberculous. I was in doubt about one, and in one I could not find evidence of tuberculosis. That led me to believe that as a diagnostic means this reaction has its value. Twenty-one days later I made a second instillation into the same eye in each one of the students. Fifty-nine per cent. of them reacted, some violently. One young man, who was quite enthusiastic in making experiments, made a third instillation in his own eye, and the inflammation that followed was extremely violent. I did not know but that it was going to be serious. The eye was kept carefully washed out with a saturated solution of boric acid, and it healed. It is dangerous to put the tuberculin too often into the same eye. In order to have a good reaction we must learn the conditions under which we give it. I think it should be applied early. It would be a great godsend if we had an absolutely safe means of early diagnosis. I think that there is one thing about the climate that we do not always realize. I say to my patients: "You are better off in Michigan under good local conditions than in Colorado under unfavorable conditions." You can prove by statistics that the best place for consumptives is in a high latitude, in a low latitude, on the land, and on the sea. The purity of the atmosphere—local conditions—is the important point. It grows on me from year to year that pure air is the best sedative we can give consumptives to allay their coughing, and in general, I think cold, pure air is more sedative than warm air.

DR. C. L. MINOR, Asheville, N. C.: My experience has taught me to believe that the tuberculin test for the presence of tuberculosis is fully justified in skilled hands and in properly selected cases, but that its indiscriminate use by members of the profession not familiar with its administration or action can be fraught with great danger. If the profession were to use it as carelessly as a doctor of whom I have heard, who, suspecting tuberculosis in a trained nurse in his employ, without making any physical examination or taking any history, told her to come to his office next morning for a test dose of tuberculin, the harm that would be done can be easily realized. Used thus, to take the place of a proper physical diagnosis, it certainly could not be recommended. Further, it should not be used simply because of doubt. Repeated examinations and great care in every step are first necessary, but if, after such repeated examinations, you have failed to find evidence of tuberculosis, although the case is very suspicious, then the test with tuberculin is justified and proper. I believe 4 mg. to be a rather dangerously large initial diagnostic dose and that the initial dose should not be over 1 mg. It also seems to me that the distribution by the board of health to the general practitioner of tuberculin for diagnostic purposes is fraught with considerable danger. As to the relative simplicity of the different methods of giving tuberculin, the subcutaneous, the cutaneous and the ophthalmic, while the mastery of the exact doses, etc., of the former, is to the beginner a little more difficult, to any one who has once learned it, the subcutaneous method is just as easy and safe, and more accurate. However valuable a therapeutic measure may be, it must be used with intelligence. Were morphin, for instance, not used in this way, the results would be disastrous. Climate must be used with discretion. But while care will always be essential to these cases, climate, combined with care, will secure results otherwise impossible.

DR. W. A. EVANS, Chicago: My reason for advocating the dosage mentioned is that the findings which result are so definite as to be unmistakable. What we are suffering from at the present time is, I believe, a lack of definiteness of conclusion. I would not say that we should do away with physical diagnosis or valuation of history; but I take exception to the view that those are sufficient in themselves. I do not believe that there is a person here to-day who, in his life work or anything else he has set himself to do, has taken the position that the situation was being met. We all know that thousands of persons are dying because physical diagnosis and valuation of history are not sufficient to make a diagnosis when the disease can be cured. Let us hold on to everything that we have, and then search for everything that we can find. We have heard here that the indiscriminate use of tuberculin in the hands of the unskilful is fraught with danger. I trusted that we might have proof that it was fraught with danger. I have been told that this diagnostic agent should be limited to the hands of the skilful. I have yet to find any sign by which the skilful are to know that tuberculin will do harm. Until they can, I do not see why we should limit it to the hands of the skilful. I think the experiments on animals have demonstrated that it is reasonably safe. I have not yet been able to find any basis for believing that it does harm in any

considerable number of cases. I do know that the valuation of history and sputum is doing harm. The consumptive at the period when there is hope for him, has to be handled by the general practitioner. I would that we could force him to go to men like Knopf who can diagnose consumption when it is curable, or Miner, but I believe that you are all of the opinion that this ideal condition will not prevail in this country. I have seen consumptives by the score going down before death cursing the members of the medical profession because they had not been told they were consumptive until they learned that there was nothing in store for them but death. We have heard that one physical examination at the hands of a man as experienced as Dr. Knopf and as Dr. Miner is not enough. We have heard that the continuous examination will eventually reveal the presence of tubercle bacilli. That is probably true. I remember that tubercle bacilli were found in a case in which they had not been found in thirteen examinations. I have been told of a case in which tubercle bacilli were found on the sixtieth attempt. You all know that when the bacillus is found on examination, the adjudication is made from one examination, and there is danger that a man will fail in his diagnosis by reason of the fact that the other fifty-nine examinations will not be made. A promiscuous use of tuberculin may here and there rarely do harm to some individual. I believe that at the same time the promiscuous use of tuberculin will mean a saving of human lives.

Dr. Vaughan has told us that the tubercle body is a multiple body, a compound, and when we inject it into our patients we poison those patients. The same holds true of morphin and chloroform. The fact is this: Everything which is powerful for good may be made powerful for harm, and the argument based on the fact that tuberculin contains poison is no better against the use of tuberculin than a parallel argument would be against the use of morphin. It does not touch the vital question, and that is: Do we add to the possibility of the discovery of the tubercle bacilli by using tuberculin? The old idea, it seems to me, has been refuted. I believe that the action on the part of the Department of Health of the City of Chicago in distributing tuberculin for the use of general practitioners will mean a saving of the lives of many of its own citizens.

DR. THEODORE B. SACHS, Chicago: The question arises if a timely and proper use of tuberculin and a correct interpretation of the resulting reaction does not require as much application and knowledge as an intelligent study of the personal history of the patient and a thorough physical examination of the chest. As an adjunct to the usual diagnostic methods, when examination and history are inconclusive, the tuberculin test has its field of application in the hands of an experienced practitioner, but always under conditions such that a proper observation of the case is possible. A point of practical importance, not to be overlooked, is the occurrence of tuberculin reaction in so-called latent cases of tuberculosis, a reaction which does not point necessarily to need of sanatorium treatment, but still is instrumental in putting the physician and patient on guard. While the practical value of ophthalmic and cutaneous tuberculin tests is still *sub judice*, the work of Birch-Hirschfeld, Calmette, Pirquet and others opens a way to modifications in the tuberculin test, divesting it of any possible harmful effects and yet preserving its reliability.

DR. J. W. SHANKLAND, St. Louis: I made a report on 142 cases of conjunctival and cutaneous tuberculin reaction before the St. Louis Medical Society last winter. In order to determine whether the reactions were produced by the tuberculous toxins or not, we first used the different diluting fluids and the glycerin bouillon in which no bacilli had been grown, both on the conjunctiva and the skin as controls with negative results. When tuberculin was added to these same diluting fluids, giving some positive results, it was proof enough that the tuberculin was the cause of the reaction. By physical examinations and microscopic work the cases were classified as follows: 1, positively tuberculous; 2, suspected tuberculous; 3, non-tuberculous with other diseases, and 4, clinically normal individuals. The general average of the cutaneous reactions in these four classes of cases shows about 50 per cent. positive. In this series of cases the conjunctival reaction fell to 25 per cent. positive. The cases in Class 3, of other diseases, gave a general average of 37 per cent. positive reactions in the 700 patients inoculated. The results of the various men working with tuberculin vary so greatly, both in the work with animals and in that with people, that at times their reports are precisely opposite; thus destroying confidence in both the conjunctival and the cutaneous reactions. I think that a great deal of work must yet be done with tuberculin before we can come to a definite conclusion as to its real diagnostic value. It would therefore be infamous to advise an individual giving a positive result to either of these reactions to leave his business and his family to seek a different climate. It is impossible to make the diagnosis without the corroboration of other findings. If tuberculin is a specific, then such advice would be possible without the consideration of other facts. As it now stands, tuberculin may be an aid to diagnosis in adults, and yet there is a great deal to be proved as to just what value as an aid these reactions are in the adult cases. Dr. Engelbach, my associate in this work, has inoculated a large number of perfectly healthy individuals in the St. Louis University; among them, a number of football players and athletes in the pink of condition. He reports positive cutaneous reactions in 50 per cent. and positive conjunctival reaction in 25 per cent. of this series of cases. We have simultaneously inoculated patients on the skin and in the eye, and would get a positive conjunctival reaction in a given case, with a negative cutaneous reaction, while in another case the result would be the reverse. We must account for this variance, and how are we going to do this in a perfectly healthy individual? To prove the relations of these reactions to the pathologic conditions found seems to me as impossible as it is to send a telegram from one city to another with the wires severed midway between the starting point and the finish. We put a drop of tuberculin in the eye, and we see the reaction follow; there the message stops. What is back of that reaction in the way of a lesion we are unable to say because we get positive reactions when no pathologic findings are present, and the degree and the kind of reaction bear no definite relation to the location, extent or activity of the lesion when one is found at autopsy. Every symptomatic message should be traceable to a functional or pathologic base.

DR. H. M. KINGHORN, Saranac Lake: It is our custom at Saranac Lake to begin with a small dose of tuberculin. Of course, we do not give the tuberculin test to any patient until we have used all other tests in making the diagnosis. When we have made a careful examination of the chest and of the sputum, if we think that there is tuberculosis present, we then give the tuberculin test. First of all, we take the temperature every two hours for two or four days. We give the test only if there is no elevation over 99.2. We then give the first test of 0.5 mg. in the evening. We regard a reaction of one whole degree above the highest point of the temperature on the previous days as definite and an elevation of less than a degree as suspicious. We then wait until the temperature has become normal and we either repeat that dose or give a larger dose. I feel that it is wiser to increase the dose from 0.5 to 2 mg., so that within two days or three days we give a second dose of 2 mg. If we get a definite reaction, of course that makes the diagnosis. If we don't get a definite reaction from 2 mg. we increase to 5 mg. after an interval of two or three days, and then to 8 and 10 mg. at intervals of two or three days. It is a very valuable thing in some cases in which the disease is strongly suspected to repeat the dose of 10 mg. I am quite sure that some cases are missed if one does not go to 10 mg. I have used the test for ten years and I have never had any bad results. Of course, the cases in which it was used were incipient cases or they would not have had the test. They were without fever. The only danger I can see in the test is from the reaction. In addition to using tuberculin for test purposes I have used it for treatment, treating as many as twenty patients in private practice at one time. All these patients will some time or another have a reaction, and I have no fear from the tuberculin reaction. Sometimes the reaction may be prolonged for several days or even a week, but I would console the beginners who are using tuberculin by

saying that the temperature will become normal if they will only keep their patient quiet and absolutely at rest. I feel as strongly as Dr. Evans and Dr. Miner do about the great value of the test. I think it is one of the finest things we have in medicine. Of course, it is to be used with great care, and the dose should be put up by some one who has had experience in the metric system when the general practitioner intends to give tuberculin injections. There will then be no mistake in the dosage.

DR. C. C. BROWNING, Los Angeles, Calif.: I endorse what Dr. Evans and Dr. Kinghorn have stated. I think dosage depends somewhat on how we are going to control our patients. In a sanitarium, where I expect to have the patient under my control, I much prefer the small dose. In addition to watching over the temperature I watch over the physical signs. Of course, I use the tuberculin test only when it is necessary to clear up an obscure case. If there have been suspicious symptoms they will be frequently augmented. It is possible that the temperature rise may be brought about by nervousness. At the time I am taking the temperature I am constantly watching until I become quite familiar with those signs. If my patient happens to be one from whom I am not likely to hear again, and it depends on what we do at one time for him, then I think that probably the larger dose is better. I have no fear of the ordinary tuberculin reaction. I have used tuberculin for years, and for the past few years have had from 75 to 100 patients under my care continuously, and any ordinary reaction I think is absolutely without danger. I think one of the great opportunities for preventive medicine is to begin teaching in the schools. We should give the pupils good ventilation. If a tuberculous patient is to be treated in a home success will be attained by making home conditions approach those of a sanitarium. I do not feel that, because it is possible that a person's temperature may be raised by the direct rays of the sun, therefore a climate in which there is a great amount of sunshine may necessarily be detrimental to that person. I do not think that there is any "best" climate for all patients. Each patient should be studied carefully, thoroughly and scientifically before a climate is recommended, just as before the administration of any medicine.

DR. GORDON WILSON, Baltimore: I do not think that enough stress has been laid on the dangers of the ophthalmic reaction. The European papers have mentioned a considerable number of cases of ulcer of the cornea and recurrent conjunctivitis following its use. My experience in its use has been only in the case of persons suspected of having the disease. I have had nearly one hundred cases, and so far the reactions have not been very severe. The most severe results that I have had have been edema about the eyes, and conjunctivitis, lasting about a week. In Baltimore there has been one bad case of ulcer of the cornea in a child who had bone tuberculosis, to whom a single dose was given according to Calmette. It was in a hospital for tuberculous children, where the chances for secondary infection were slight, and as soon as the reaction took place the usual treatment for conjunctivitis was instituted. I heard night before last of a doctor in Denver, Colo., who tried it on himself, and he had a severe conjunctivitis. Since then he has noticed that after reading late at night the conjunctiva of that eye is markedly injected on the following morning. I think that we are dealing with a dangerous agent, dangerous because used on a very important organ of the body. The danger of secondary infection is present in both the ophthalmic and the skin test, but there is less danger from secondary infection when injected in the skin.

DR. C. H. JOHNSTON, Grand Rapids, Mich.: What constitutes a reaction? Dr. Kinghorn says that a reaction in his mind simply consists of an elevation of temperature of one degree. This is not the belief of all of Dr. Kinghorn's colleagues. Two of them have told me repeatedly that, in addition to the elevation of temperature, there must be some other indication, such as backache, or headache, or muscular pains. In Dr. Kinghorn's opinion, is a simple rise of temperature alone, without any other indications, enough for us to base a diagnosis of a reaction on? I hope to-day to get some definite information on the relative importance or reliability of the ocular as compared with the hypodermic test, because in the last few months, in ten different cases, I got no reaction with the eye test, but got a reaction with the hypodermic test. One of my friends said to me that it was probably due to the material that the test was made with, but the material in these cases was the same as was followed by positive reaction in other cases.

DR. H. M. KINGHORN, Saranac Lake: The temperature is the important point in a reaction. When you have a temperature of one degree over the highest previous temperature, and that one degree of temperature has been rising slowly, any one who has had any experience with the tuberculin reaction will understand that this is characteristic. The temperature rises slowly, and then drops. Even without other symptoms I regard it as very definite. You only occasionally meet patients who will have a temperature of 101 without any other constitutional symptoms except a rapid pulse. That occasionally occurs. Usually, however, with that rise in temperature you will have a definite feeling of malaise, which accompanies the tuberculin reaction, also headache, loss of appetite, pains and aches all over, and very frequently a large lump at the seat of the injection. All this constitutes a tuberculous reaction. However, where the temperature rises slowly I regard it as a definite reaction without those symptoms.

DR. S. H. GILLILAND, Marietta, Pa.: I have prepared much of the tuberculin for use. It has been said that tubercle bacilli may be found in suspension. If the tuberculin is prepared according to the original method of Koch it is impossible to have tubercle bacilli in suspension. As Dr. Vaughan said, after they have grown on the glycerin beef broth the tubercle bacilli are then removed from the beef broth by triple filtration. You must see that the filter is efficient and that the organisms do not go through. The filters I use are tested in this way: A virulent culture of tubercle bacilli suspended in salt solution or media is filtered and the filtrate injected into guinea-pigs, thus determining the efficiency of my filters. I can then feel positive that the filtrate is free from tubercle bacilli. Dr. Smithies brought out the point that for human beings afflicted with tuberculosis the tuberculin should be made from the tubercle bacilli of human type. I am at a loss to understand that statement, as I have made tuberculin from tubercle bacilli of bovine type, and have obtained equally reliable results. It is an accepted fact that a number of cases of tuberculosis are of direct bovine origin. I have supplied material for about 12,000 tests. That excludes the subcutaneous test, but of the other tests the majority were ophthalmic. I have heard of no bad or unsatisfactory results. I have heard of all the work that has been done in this country through the use of my tuberculin, bad and good, and in a series of cases in which a man made three tests in one person the results were almost absolutely uniform. That has not been the case in certain other countries. The eye test has given a positive reaction and the cutaneous test has failed, and vice versa. In these cases the tuberculin was all prepared from the same strain of tubercle bacilli. I believe that the eye test is one with which a certain degree of danger is associated, and I do not believe that the physician is fully justified in using it freely to diagnose any condition in the body; that is, provided we have another test, and I feel that we have other tests that are equally reliable, at any rate in children. Whether they are so in adults remains to be seen.

DR. M. P. RAVENEL, Madison, Wisconsin: I agree with what Dr. Kinghorn has said most thoroughly and believe that tuberculin should be used in every doubtful case. I am sorry that Dr. Knopf has apparently approved the diagnosis by bacilli in the sputum. I think that is one of the worst doctrines that has ever been taught in regard to diagnosis, and am thoroughly convinced that it is responsible for the death of many people. Bacilli can appear in the sputum only after softening and breaking down of the tubercle has taken place. In the great majority of cases this means secondary infection, and a diagnosis based on such findings can not be considered an early one. I believe that the tuberculin test in doubtful cases will enable us to make a much earlier diagnosis than this, and in this way many lives will be saved. I can not entirely agree with Dr. Evans as to the wisdom of putting it

in the hands of general practitioners, although I have no doubt that every educated physician can learn its proper use. At the present time it is best used by specialists. I can not agree that this is saying anything against the practitioner, any more than it is to say that the general practitioner should not attempt an oöphorectomy. I am sure that the general physician does not regard it as an attack on him when one advises that cases of surgery go to a surgeon, and at the present time it is the same thing with regard to the tuberculin test. In regard to what constitutes a reaction, if temperature alone is taken as an index, mistakes may be made. It is, of course, a part of the symptom-complex, and a most important part, but should be taken in connection with all other symptoms, subjective and objective. The diagnosis should not be made on any one particular symptom. The point made by Dr. Sachs is well taken. I have recently, in some experiments with tuberculin in the shape of ointment, observed a typical reaction in two men who were in the best of health, one of whom more than a year ago had a cutaneous tubercle. Neither of these men was a subject for sanitarium treatment. While these are special cases, there are many others who will give the tuberculin reaction but who are not fit subjects for sanitarium treatment.

Theoretically, the proposition was correctly stated by Dr. Knopf, that the climate which enables the patient to spend the greatest amount of time in the open air with least expense of vital force is the best one for the treatment of tuberculosis. Practically, this does not seem to hold true. I do not know of any place in any country where better results are obtained than at Saranac Lake, and yet it can not be called an ideal climate according to the standards laid down. I believe that there are certain patients who do better in a selected climate, but that most patients should be treated as near their homes as possible. Sending people hundreds of miles away from home without friends and without money is one of the most cruel things that can be done. More important than climate is the personality of the attending physician. The man who has his patients under strict discipline and who is able to inspire them with hope and courage is the man who gets the best results regardless of what the climate is.

DR. CHARLES L. MINOR, Asheville, N. C.: I admit that climate without care is almost useless, since the results obtained will be only temporary; but I also maintain that except in unusually favorable cases the best results are not likely to be obtained with care but without climate, and any one, by the use of a little thought, must realize, unless he is so prejudiced as to have his mind closed to conviction, that the combination of these two good things will give the best results.

DR. S. A. KNOPF, New York: About ten years ago, in my first book, I stated that to find the bacilli was absolute proof of the presence of tuberculosis and that not finding them did not exclude the possibility of a pulmonary tuberculosis. I stated distinctly this morning that, as a rule, we find the bacilli only when disintegration has taken place, but this should not be an excuse for not looking for them. I also have been misunderstood in regard to my attitude as to tuberculin. We have now some tuberculin test methods which are relatively free from danger, such as the skin method, the use of which may be justified in rare instances. After the patient's history has been taken and a careful physical diagnosis has been made, he should be informed of the consequences of the tuberculin test. His permission, and that of his family physician, and the approval of the practitioner's own conscience, should be obtained before making the test. How many of you would be willing to have 4 mg. of tuberculin injected into you without a previous physical examination justifying it as a last resort? I still plead with you not to neglect what our fathers have taught us, a careful taking down of the history, and a still more careful physical diagnosis.

DR. FRANK SMITHIES, Ann Arbor, Mich.: In the routine work of teaching physical diagnosis I have had ample opportunity of observing the effects of both the subcutaneous and the conjunctival reactions to tuberculin. I agree heartily with Dr. Knopf that no form of tuberculin test can take the place of accurate physical examination with the patient stripped. But there are many patients about whom, even after careful examination, one is in doubt. In these some variety of tuberculin test is indicated. I have faith in the ability of the general practitioner to make a reliable test with tuberculin subcutaneously administered, if the practitioner will only take the time to do so. In general practice the conditions are entirely different from those in hospitals or sanatoria, and as a consequence the details connected with the proper administration of tuberculin subcutaneously are more difficult to see to, and as a result the method does not always yield dependable information. I had these facts in mind when I took up the study of the conjunctival reaction, and my endeavor was to secure figures for a dependable and at the same time a conveniently carried out test. I am still inclined to the belief that where men have presented figures from sufficiently large series of cases the results have been favorable to the use of the conjunctival test. Of course, it is quite useless to compare the majority of the German reports with those from the French, inasmuch as in Germany there seems to be a prejudice against the test, largely on account of Calmette's name being associated with it. Then again, the tests have been made in Germany with a great variety of tuberculin preparations, many of which are now recognized as being unfitted for the work. I admit that here and there serious consequences have followed the conjunctival test. I called attention to four violent reactions in the work of Dr. Walker and myself this morning. I know of no case, however, in which such results have followed when the eyes were negative before the test was administered and were looked after following the instillation of the tuberculin. Regarding the different varieties of preparation used, I believe that when possible we should use tuberculin from human bacillus growths when testing human beings. In my opinion, the work of Detre with the cutaneous reaction seems to prove that more distinct manifestations are secured in tuberculous subjects when tuberculin from human bacillus growths are used, in preference to bovine bacillus growth tuberculin. I believe that many of the commercial tuberculin "discs" are not dependable.

THE DIAGNOSTIC VALUE OF THE CUTANEOUS AND CONJUNCTIVAL TUBERCULIN REACTIONS *

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AND

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In endeavoring to arrive at definite conclusions as to the diagnostic value of the recent local tuberculin reactions, we have made a study of the literature on this subject to May 1, 1908, to which we have added the results of personal observations on 1,242 cases. The review of the literature includes the opinions of nine authors on their results with animal experiments; the reports of 41 authors on 5,032 cases of all ages subjected to these reactions, 3,477 to the conjunctival reaction and 1,546 to the cutaneous reaction. Our own investigations were made on adults only at the St. Louis City Hospital and the St. Louis University Medical School. They consist of 499 cutaneous reactions and 743 conjunctival reactions on 125 positive tuberculous cases, 190 suspect tuberculous cases, 700 other diseases not tuberculous clinically and 90 clinically normal individuals. The sum total of all cases considered is 6,305.

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* Read in the Section on Practice of Medicine of the American Medical Association, at the Fifty-ninth Annual Session, held at Chicago, June, 1908.

* Owing to lack of space, the article is here abbreviated by the omission of the portions relating to technic and histology as well as some of the case reports and tables. The complete article appears in the Transactions of the Section and in the authors' reprints.

ANIMAL EXPERIMENTS

Lignieres[15] and Valle[16] produced positive conjunctival and cutaneous reactions in tuberculous cattle and horses, and constantly obtained negative reactions in these normal animals. Klemperer[17] observed only one negative cutaneous and conjunctival reaction in a series of tuberculous cattle. Positive reactions have been demonstrated by Valle[16] in tuberculous dogs and rabbits, and by Klemperer in guinea-pigs and dogs. Wildbolz's[18] autopsy findings in rabbits confirmed the value of these reactions. He obtained negative results with both these reactions in twenty normal rabbits which, with one exception, gave positive reactions to both tests six weeks after they had been inoculated in the bladder with tubercle bacilli.

Necker and Paschkis[19] report that the inoculation of animals has confirmed the value of the cutaneous reaction in tuberculosis of the genitourinary tract. In forty-two suspected cases of genitourinary tuberculosis in the human they had only one positive cutaneous reaction which was not substantiated by animal inoculation of urine. Notwithstanding the above favorable reports, a majority of the investigators have reported unsatisfactory results with these experiments. Arloing[20] observed in nineteen tuberculous animals (cats, goats, dogs, rabbits and guinea-pigs) a positive cutaneous reaction which could not be considered specific, however, because the identical reaction occurred in nine normal control animals.

Joannowics and Kapsammer[21] obtained negative results with both reactions in a large series of tuberculous guinea-pigs. Levi and Klopstock[22] did not obtain a positive conjunctival reaction in the series of tuberculous guinea-pigs and dogs. Vaccination of tuberculous guinea-pigs with from a 1 per cent. to a pure solution of tuberculin constantly gave negative results. One animal gave a positive conjunctival reaction and on postmortem no tuberculous lesion was found. One which had given a positive conjunctival reaction to a 1 per cent. solution was free of tuberculous lesions at autopsy. Wolff[23] did not produce positive reactions in tuberculous guinea-pigs or rabbits, although these animals gave positive reactions to the subcutaneous test. From these investigations one must infer that the results of this research have been so variable as not to aid the establishment of the specificity of these reactions.

POSITIVE TUBERCULOSIS

Cutaneous Reaction.—In 500 cases of positive tuberculosis, in patients between the ages of 5 and 14 years, von Pirquet reports 88 per cent. positive and 12 per cent. negative reactions. In a series of 143 cases (Table 1), of patients of all ages compiled of seven different authors, 70 per cent. gave positive reactions and 30 per cent. negative. In our own investigations of 55 cases (Table 10) 31 or 56 per cent. of the patients gave positive reactions, and 24 or 44 per cent. negative. A majority of our patients were in the third stage.

Conjunctival Reaction.—Of 1,572 cases by 30 different authors (Table 5) selected from the literature, 86 per cent. of the patients gave positive and 14 per cent. negative reactions. Schroeder and Kaufman[24] (Table 9) from a collection of 971 cases report that the patients in 88.5 per cent. gave positive and in 11.5 per cent. negative reactions. Our own results (Table 10) in the positive tuberculous cases with the conjunctival reaction was that of 70 patients 52 or 74 per cent. were positive and 18 or 26 per cent. were negative. The majority of these patients also were in the third stage. Wolff[23] found 30 per cent. of the patients in the first and second stages of tuberculosis reacted negatively to the conjunctival test and 37 per cent. negatively to the cutaneous reaction. Heinemann reports six cases of patients in the first and second stages of tuberculosis and Levi[22] four cases of patients not in the advanced or cachectic stages of tuberculosis (one of the kidney, one of the prostate, two of the knee-joint), which gave negative reactions. Webster and Kilpatrick[25] report cases of patients with beginning tuberculosis which gave negative conjunctival reactions. Mentoux[26] obtained negative conjunctival reactions in ten positively tuberculous children in the first stages of disease, MacLennan[27] obtained negative reaction in early tuberculosis (patients with hip disease in good condition and in two patients with phthisis which reacted positively to 10 mg. of tuberculin (O. T.) subcutaneously). Kleinberger[28] reports 7 negative and 2 doubtful reactions of 17 patients with not advanced tuberculosis.

SUSPECTED TUBERCULOSIS

Cutaneous Reaction.—in a series of 23 cases of children von Pirquet[4] reports 5 positive and 18 negative reactions. The patients in the 5 positive cases proved to be tuberculous and 15 of the patients in the negative cases were found to be free from tuberculosis at necropsy. In 195 cases of five authors (Table 2) 55 per cent. of the patients reacted positively, 44.5 per cent. negatively and in 0.5 per cent. the results were doubtful. In our own results (Table 11) of 55 patients with suspected tuberculosis other than pulmonary (arthritis, adenitis, peritonitis, meningitis, etc.) 30 or 55 per cent. reacted positively and 23 or 45 per cent. negatively. In 42 patients with clinical symptoms of pulmonary tuberculosis (Table 12) 28 or 67 per cent. reacted positively and 33 per cent. negatively.

Cutaneous Reaction.—In a series of 23 cases of chil- (Table 6) 48 per cent. of the patients reacted positively, 50 per cent. negatively and in 2 per cent. the reaction was doubtful. Schroeder and Kaufman[24] (Table 9) reported practically the same percentage, 51.4 per cent. positive and 48.6 per cent. negative. For our own results (Table 11) in 40 cases other than pulmonary 21 or 52 per cent. of the patients resulted positively and 19 or 48 per cent. negatively. Of 52 patients with the clinical symptoms of pulmonary tuberculosis 15 or 28 per cent. reacted positively and 38 or 72 per cent. negatively (Table 12).

OTHER DISEASES CLINICALLY NON-TUBERCULOUS

Cutaneous Reaction.—Of 252 cases in the literature (Table 3) 15 per cent. of the patients reacted positively

15. Semaine méd., 1907, p. 585.
16. Acad. d. sc., May 27, June 17, 1907; Semaine méd., 1907, pp. 85, 309.
17. Deutsch. med. Wchnschr., 1908, No. 4.
18. Berl. klin. Wchnschr., March 16, 1907.
19. Wien. klin. Wchnschr., March 5, 1908.
20. Soc. de biol., June 22, 1907.
21. Berl. klin. Wchnschr., 1907, No. 45.
22. Berl. klin. Wchnschr., Feb. 3, 1908. Deutsch. klin. Wchnschr., No. 3, 1908.
23. Berl. klin. Wchnschr., Feb. 10, 1908.
24. München. med. Wchnschr., Jan. 14, 1908.
25. Brit. Med. Jour., Dec. 7, 1907.
26. French Congress for Internal Medicine, Paris, München. med. Wchnschr., Jan. 14, 1908.
27. Brit. Med. Jour., Dec. 7, 1907.
28. München. med. Wchnschr., Jan. 14, 1908.

and 85 per cent. negatively. In our own results (Table 14) in 268 cases 149 or 56 per cent. of the patients reacted positively and 119 or 44 per cent. negatively.

Conjunctival Reaction.—From a total of 932 cases collected (Table 8) the reactions of the patients in 17 per cent. were positive and in 83 per cent. negative. Schroeder and Kaufman[24] (Table 9), on a basis of 627 cases, found the patients' reactions in 12.7 per cent. positive and in 87.3 per cent. negative. Our own results (Table 13), with 417 patients, gave 102 or 24 per cent. positive and 315 or 76 per cent. negative. Cohn[9] produced positive reactions in 38 per cent. of the cases of typhoid. Plehn[29] obtained positive reactions in 2 of 5 patients with typhoid, 2 of 5 patients with scarlet fever, 6 of 12 patients with articular rheumatism, 3 of 6 patients with acute bronchitis, and in 3 patients with enteritis. In none of these patients was there the slightest evidence of tuberculosis. In one case, a pregnancy complicated with pleurisy, a positive reaction occurred from a 1 per cent. solution, and in the other eye two weeks later a negative reaction occurred from a 2 per cent. solution. In a case of articular rheumatism the patient gave a positive reaction during the activity of the symptoms. The symptoms of rheumatism promptly subsided on the administration of salicylates, but two weeks later returned and, simultaneously, without installation, a marked conjunctival reaction recurred in the eye previously instilled. Reuschel[30] reports one case of a patient with leukemia (free from tuberculous lesions at autopsy), which gave a positive reaction. Blum[31] obtained 16 per cent. of positive reactions in non-tuberculous diseases. Fisen[32] observed positive reactions in 31 per cent. of various non-tuberculous infections. Serafini found that the ocular reaction is not conclusive in tuberculosis of the bone. The reaction was positive in certain gonorrheal, senile and other non-tuberculous articular affections.

CLINICALLY NORMAL INDIVIDUALS

Cutaneous Reaction.—Of 181 cases selected from the literature (Table 4) 91 or 50.2 per cent. of the patients gave positive and 49.8 per cent. gave negative reactions. The patients were of all ages. Burnet[13] reports positive cutaneous reactions in non-tuberculous people. Kleinberger obtained positive reactions in 16.6 per cent. of normal individuals. Stadelman[33] obtained positive reactions in 50 per cent. of adults. Warfield[34] reports 7 positive reactions in apparently normal individuals (1 in a 7-months-old baby and 6 in adults). von Pirquet[1] has found that in individuals from 10 to 14 years of age 55 per cent. and in adults 90 per cent. reacted positively. Freer obtained 35 per cent. of positive reactions in patients between the ages of 10 and 15 and Mainini[35] obtained positive cutaneous reactions six times more frequently than conjunctival reactions.

Conjunctival Reaction.—Of 351 cases selected from the literature (Table 8) 11 per cent. gave positive reactions and 88 per cent. negative and 1 per cent. doubtful. Smithies and Walker[36] obtained negative reactions in 70 apparently normal individuals. Webster and Kilpatrick[25] observed two positive reactions in four normal individuals. Mentoux[26] produced positive reactions in 16 children in only 3 of whom was there a slight suspicion of tuberculosis clinically. Stadelmann[33] obtained positive reaction in 16 per cent. of normal individuals. Baldwin[8] obtained 16 positive reactions in 57 normal individuals or a percentage of 28.

Our own results of clinically normal individuals were obtained from experiments on students of the St. Louis University. These students were apparently healthy and many of them were active athletes, such as football men. Of a total number of 90 patients (Table 14) subjected to these reactions 79 were given the cutaneous and 70 the conjunctival, the entire number not taking both reactions. Of 79 cutaneous reactions 41 or 51 per cent. were positive, 18 negative and 20 doubtful, or 49 per cent. negative or doubtful. In 70 of these the conjunctival reaction in 18 or 25.5 per cent. was positive, in 46 negative and in 6 doubtful, or 74.5 per cent., was negative or doubtful. In 63 of these students who volunteered to take both reactions at the same time, the following remarkable results were obtained: In 43 per cent. both reactions were negative or doubtful; in 19 per cent. both reactions were positive; in 33.3 per cent. the cutaneous was positive and conjunctival was negative; in 4 per cent. the cutaneous was negative and the conjunctival was positive; 57 per cent. reacted positively to either one or both; 52 per cent. gave positive cutaneous, and 23 per cent. positive conjunctival reaction.

Of the students who gave positive reactions six gave histories of either having tuberculosis in the family or of exposure to tuberculosis. In over twenty who were examined no clinical evidence of tuberculosis could be demonstrated. Two of the students who gave positive conjunctival reactions had chronic conjunctivitis. In three of the students conjunctival reactions were produced which required treatment. In one case a marked phlyctenular conjunctivitis, and in another edema of the eye-lid with a severe conjunctivitis occurred.

SUMMARY

We must agree with Smithies and Walker[36] that the failure of definite conclusions with regard to these reactions in the above cases is to a certain extent due to poor technic, difference in the tuberculin preparation, absence of more positive control than the clinical findings, indefinite standard of reactions and the presence of unknown conditions which modify or prevent these reactions. Whether or not all of the above difficulties will ever be satisfactorily overcome, from the present status of the accumulated report on these reactions in adults, we deduce the following marked inconstancy with regard to their value as diagnostic agents:

SUMMARY OF ALL CASES CONSIDERED

CUTANEOUS REACTIONS

	No. Cases.	Per c't. Pos.	Per c't. Neg.
I. Positive Tuberculosis.			
Seven authors (Table 1)	143	70	30
Engelbach and Shankland (Table 10)	55	56	44
II. Suspected Tuberculosis.			
Five authors (Table 2)	195	55	45
Engelbach and Shankland (Table 11)	190	61	39
III. Other Diseases.			
Five authors (Table 3)	252	15	85
Engelbach and Shankland (Table 13)	268	56	44
IV. Clinically Normal.			
Four authors (Table 4)	181	50	50
Kleinberger	...	17	83
Freer (10 to 15 years)	...	35	65
Stadelmann	...	50	50
Engelbach and Shankland (Table 13)	517	24	76
Pirquet (10 to 14 years)	...	55	45
Pirquet (Adults)	...	90	10

29. Deutsch. med Wchnschr., Feb. 20, 1908.
30. München. med Wchnschr., Feb. 25, 1908. Reuschel quotes a case of leukemia reported by Escherich[37] in which there was a marked reaction to an injection of 4 mg. tuberculin (O. T.).
31. München. med. Wchnschr., Jan. 14, 1908.
32. Beitr. z. Klin. d. Tuberk., viii, No. 4.
33. München. med. Wchnschr., Jan. 14, 1908.
34. THE JOURNAL A. M. A., Feb. 29, 1908, l, 687; Interstate Med. Jour., March, 1908.
35. München. med. Wchnschr., Dec. 17, 1907.
36. THE JOURNAL A. M. A., Jan. 25, 1908, l, 259.

CONJUNCTIVAL REACTIONS

	No. Cases.	Per c't. Pos.	Per c't. Neg.
I. Positive Tuberculosis.			
Thirty authors (Table 5)	1572	86	14
Schroeder and Kaufman (Table 9)	971	85.5	11.5
Engelbach and Shankland (Table 10)	70	74	26
II. Suspected Tuberculosis.			
Twenty-two authors (Table 6)	642	48	52
Schroeder and Kaufman (Table 9)	284	51	49
Engelbach and Shankland (Tables 11-12)	190	40	60
III. Other Diseases.			
Nineteen authors (Table 7)	932	17	83
Schroeder and Kaufman (Table 9)	627	13	87
Engelbach and Shankland (Table 13)	517	24	76
IV. Clinically Normal.			
Eight authors (Table 8)	351	11	89
Stadelmann	...	16	84
Engelbach and Shankland (Table 14)	79	25.5	74.5
Baldwin	70	28	72

In positive tuberculosis the negative cutaneous reactions have varied from 30 per cent. to 44 per cent., and the negative conjunctival reactions from 11.5 per cent. to 26 per cent. It has been conceded from the first that patients with advanced tuberculosis give negative reactions. The later reports, however, of Wolff, Levi, MacLennan, Kilpatrick, Klemperer and others prove that patients in the first and second stages of tuberculosis, in good condition, also frequently give both cutaneous and conjunctival negative reactions. Negative reactions in beginning tuberculosis have been reported in as high as 30 per cent. to 37 per cent. of the cases by Wolff.

In suspected tuberculosis there is a constant finding in the hands of different men of about 50 per cent. negative and 50 per cent. positive reactions. The positive reactions in these cases have varied from 40 per cent. to 48 per cent. with the conjunctival reaction, and 55 per cent. to 61 per cent. with the cutaneous reaction.

In other diseases not considered tuberculous clinically the percentage of positive reactions has varied from 15 per cent. to 56 per cent. with the cutaneous and from 13 per cent. to 24 per cent. with the conjunctival.

In clinically normal individuals there has been a wide range of difference with the positive reactions. These have ranged from 17 per cent. to 90 per cent. with the cutaneous reaction, and from 11 per cent. to 28 per cent. with the conjunctival reaction.

In comparing the table of cases selected from the literature one is struck with the same amount, practically, of positive reactions which occur in non-tuberculous diseases and clinically normal individuals. In comparing the suspected with the positive tuberculous cases compiled, the difference is not enough to warrant positive conclusions.

	Cutaneous. P.C. Pos.	Cutaneous. P.C. Neg.	Conjunctival. P.C. Pos.	Conjunctival. P.C. Neg.
Positive Tuberculosis	56	43	74	26
Suspected Tuberculosis (not pulmonary)	55	45	52.5	47.
Suspected Tuberculosis (pulmonary)	67	33	28	72
Other Diseases (non-tuberculous clinically)	56.5	43.5	24	76
Clinically normal individuals	51	49	25.5	74.5

In our own work, which is shown in the above table, the cutaneous reaction in the five conditions (positive tuberculosis, 56 per cent.; suspected tuberculosis, not pulmonary, 55 per cent.; suspected pulmonary tuberculosis, 67 per cent.; other diseases, 56 per cent.; clinically normal individuals, 51 per cent.) was practically the same percentage. Our cases of positive conjunctival reaction in suspected pulmonary tuberculosis (28 per cent.), other diseases non-tuberculous clinically (24 per cent.) and clinically normal individuals (25.5 per cent.) also occurred practically in the same relative number of cases.

CLINICALLY NORMAL INDIVIDUALS SUBJECTED TO BOTH CUTANEOUS AND CONJUNCTIVAL REACTIONS

	No.	Per Cent.
Individuals	63	..
Positive reactions	36	57
Positive cutaneous reactions	33	52
Positive conjunctival reactions	15	23
Positive cutaneous, negative or doubtful conjunctival	21	33
Positive conjunctival, negative or doubtful cutaneous	3	4

Furthermore, a perusal of the above table will demonstrate that these reactions are very variable in normal individuals, i.e., one reaction will be present in the absence of the other one without any definite relation or apparent cause for this variation. We have also observed this variance in known tuberculous cases and in other diseases not considered tuberculosis clinically.

LOCAL LESIONS OF THE EYE

It has already been established that a number of diseases of the eye, tuberculous and non-tuberculous, will in themselves give positive reactions and absolutely interdict the use of the conjunctival reactions. These conditions of the eye necessarily restrict the use of this reaction in a high percentage of cases. The lesions of the eye may be so slight as to be entirely overlooked by those not especially skilled in the diagnosis of eye diseases. It is probable that in two of our normal cases in which the patients gave positive eye reactions, that this reaction was due entirely to a slight chronic conjunctivitis which was not observed previous to the instillation. The above facts probably account for many of the positive reactions which are credited to non-tuberculous diseases.

THE SPECIFICITY OF OTHER TOXINS

In attempting to determine the specificity of tuberculin reactions it is necessary to consider the specific reactions of other toxins applied in this manner, especially those reactions produced or present in other diseases with tuberculin and the reactions produced in tuberculosis by other toxins.

Our own observations with the use of typhoid toxins in known tuberculous cases and other diseases (Table 15) are as follows: We instilled 78 patients with this toxin. Of 48 positive tuberculous patients 8 reacted positively in the first 36 hours. Only 2 of these reactions remained positive after the first 36 hours. None of these patients gave a history of typhoid. Of the 29 patients with other diseases not tuberculous, 1 reacted markedly and 2 gave mild reactions after 24 hours. None of these three patients had had typhoid. Among these cases, however, were three typhoid patients, of whom one gave a negative, and 2 gave slight reactions after 36 hours. We used in this series of typhoid toxin instillation 1 per cent. and 2 per cent. toxin furnished us by the Alexander Laboratory. This laboratory did not recommend the toxin on account of having some difficulty in providing a reliable one which actually contained typhoid toxin. The difficulty has been encountered by Orsvag and others who claim it is impossible to obtain typhoid toxin for this use on account of the toxins of typhoid being endotoxins.

We are led to conclude from the above that toxin reactions in general have not proved specific for the following reasons: 1. Tuberculin gives positive reactions in cases of typhoid fever; 2, typhoid toxin reactions have been demonstrated positive in tuberculosis; 3, the different toxins, typhoid, paratyphoid, colon and tuberculin have given positive reactions in the same case.

ACTIVITY OF THE LESION

Believing that both of these reactions are specific ones for tuberculosis, Wolff-Eisner, Mainini,[35] Stadelmann[33] and others maintain that they also indicate the activity and the extent of the lesion. They believe that a positive cutaneous reaction with a negative conjunctival reaction on the first instillation with a positive conjunctival reaction on the second instillation indicates a latent tubercular lesion. A positive conjunctival reaction at the first instillation is indicative of an active tuberculous lesion. Wolff-Eisner and Teichmann[57] draw definite conclusions from the onset, intensity and the duration of the cutaneous reaction to the activity of the lesion and the prognosis of the case. They have described the following three types of the cutaneous reaction:

Type 1.—The reaction begins 4 to 6 hours after vaccination, reaches its greatest intensity in 20 to 24 hours, as an elevated papule, 10 to 20 mm. in diameter, continuing thus throughout the second day, and gradually disappearing during the third and fourth day to a slight pigmented area for the course of 3 or 4 weeks. There are two varieties of this type, the "marked" and the "moderate." This type is taken to indicate incipient tuberculosis, and first and second stage of tuberculosis, of non-progressive type with a favorable prognosis.

Type 2.—This is a slight reaction characterized by rapid course of mild intensity. It begins about the sixth hour, rapidly reaches its acme, sometimes in 10 hours, when it is from 4 to 10 mm. in diameter, and rapidly disappears not later than the second day without pigmentation. It is said to occur in the third stage of tuberculosis, and in the first and second stages of unfavorable cases having a bad prognosis.

Type 3.—This is a late prolonged reaction. It begins as the other types, reaches its greatest intensity 8 to 10 mm. in diameter at the end of the second day, and persists unchanged for at least a week. It is taken to indicate latent tuberculosis.

The conjunctival reaction they say occurs only in Types 1 and 2, in varying degrees of intensity. They conclude that the cutaneous reactions show marked differences in intensity in the various forms of tuberculosis, depending on the lysis of the bacilli-débris, and the effect on the body of the toxins set free.

In contending against the value of the diagnosis of the activity of the lesion, as claimed above, we wish to join those investigators who disagree with these authors for the following reasons: 1. Animal experimentations have not confirmed their findings; 2, positive tuberculosis of the first and second stages have given both the conjunctival and cutaneous reactions in an inconstant manner, a negative cutaneous reaction, or negative cutaneous reaction with a positive conjunctival reaction; 3, the clinical course of cases giving these reactions has not borne out their predictions; 4, not enough absolute postmortem control has been observed to substantiate their theory.

Baginsky[58] reports negative cutaneous reactions in a child in good general condition who reacted positively to 1/5 mg. tuberculin (O. T.) subcutaneously. Wolff,[23] Heinemann,[59] Levi,[22] MacLennan[27] and others have shown that negative reactions occur in the first and second stages of active, but not cachectic, tuberculosis. Webster and Kilpatrick[25] have demonstrated that the conjunctival reaction occurred in clinically quiescent and non-quiscent tuberculosis. Mentoux[26] has shown that negative conjunctival reactions occur in beginning active tuberculosis, and that positive reactions were present in non-tuberculous children.

The clinical course on positive reactions has not borne out the prognostic value of the combined reactions as demonstrated by Heinemann,[59] who reports one case of tuberculous peritonitis which gave a negative reaction with a final recovery. He also reports a case of bilateral apical lesion which was treated for many months after negative reactions, and which gave later a positive reaction. Engel and Bauer[60] found 6 cases which gave positive cutaneous reactions, five of the patients were certainly free from tuberculosis, as proved in one case by postmortem, and in four cases by negative subcutaneous reaction.

Our own observations have demonstrated a marked variability of the occurrence and intensity of these reactions which we have not been able to explain upon the activity or extent of the lesion. The relationship of these reactions either in combination or the degree of intensity of the single reaction are so inconstant that we are inclined to believe with Reuschel[30] that the reactions demonstrate at most the presence of anti-tuberculous bodies and not tuberculosis. These antibodies depend more on the resistance of the body for their productions than the extent or activity of the infection. The variability of these reactions on this basis is consequently more easily explained. It is yet to be determined, however, whether the sensibility, demonstrated by these methods, is due to antibodies or to albuminous substanes in the serum.

PROGNOSTIC VALUE

The prognostic as well as the diagnostic value of these reactions have been affirmed by the majority of the investigators as more or less certain. Some have even claimed that a negative reaction in known tuberculosis indicates a very unfavorable prognosis, death occurring in the majority of these cases within ten days. The same contention would apply to these tests as has been given above, i. e., the questionable specificity of these reactions and the inconstant relationship of the activity and extent of the lesions to the intensity of the reaction. The presence of negative reactions in non-progressive tuberculosis of the first and second stage, as demonstrated by Wolff, Heinemann, Levi, Phlen and Mentoux, and the presence of a positive conjunctival reaction with a negative cutaneous reaction in clinically normal individuals, argue against this claim for these reactions. The clin-

DURATION OF LIFE AFTER REACTIONS IN POSITIVE TUBERCULOSIS

Days from reaction to death.	Reactions.		Positive (26)	Negative (26)
1 to 10	pos.	7	*b, a, b, a, b, b, a*	*b, d, b, d, a, b*
	neg.	11	.....	*b, a, a, a*
10 to 20	pos.	5	*b, b, b, a, a*	*b, b, a, a, d, e*
	neg.	6	.....	.....
20 to 30	pos.	6	*b, b, b, b, b, c*	*c* (112 days)
	neg.	3	.....	.....
40 to 50	pos.	3	*b, b, a,*	*a, b*
	neg.	2	.....	.....
After 50	pos.	5	*a* (120 days) *c* (87 days)	*b* (69 days) *d* (59 days)
	neg.	4	*c* (128 days) *a, d, e*	*d* (83 days) *c* (71 days)
Total		52	*c* (68 days)	

(*a*, cutaneous reaction; *b*, conjunctival reaction; *c*, both reactions positive; *d*, both reactions negative; *e*, cutaneous reaction positive, and conjunctival negative.)

57. Berl. med. Wchnschr., Jan. 13, 1908.
58. Berl. med. Wchnschr., June 3, 1907.
59. München. med. Wchnschr., March 17, 1908.
60. Berl. klin. Wchnschr., No. 37, 1907.

ical course and postmortem findings of cases subjected to these reactions have not borne out this significance of these reactions. Known tuberculous patients have given negative reactions and then been observed for a long time or cured as reported by Heinemann,[59] Sabrazes, Duperes[14] and others.

In our own work we had 52 patients who died after being subjected to these reactions (see above table). Twenty-six of the patients reacted positively and 26 negatively. Of those who died in the first ten days, after one or the other of these reactions, 7 reacted positively and 11 negatively. Of 11 patients who died in from 10 to 20 days after inoculation 5 reacted positively and 6 negatively. Ten patients died in from 20 to 30 days after inoculation, of whom 3 reacted negatively and 7 positively. Of 5 patients who died in from 40 to 50 days after inoculation, 3 reacted positively and 2 negatively. Nine patients lived for from 50 to 128 days after being inoculated; four of these reacted negatively and 5 positively. Three patients who were not considered tuberculous clinically, and on whom the postmortem findings were negative, gave positive reactions. One of these gave a positive cutaneous reaction 6 days before death. One gave a positive cutaneous and

TABLE 1.—CUTANEOUS REACTIONS.—POSITIVE TUBERCULOSIS

Author.	No. of Cases.	Age.	Reaction. Pos.	Reaction. Per Cent.	Control Diagnosis.	Reaction. Neg.	Reaction. Per Cent.	Control Diagnosis.
1. Pirquet[1]	.....	5-14	.....	88	.....	.....	12	
2. Olmer and Terres[70]	37	.....	20	.....	.....	11		
3. Baginsky[58]	1	Child	.....	.....	.....	1	.....	Pos. to 0.5 and 0.2 mg. sub.
4. Wolf[23]	19	17 adults, 2 child.	12	63.2	First and second stage.....	7	36.8	First and second stages.
5. Reuschel[30]	28	.....	10	.....	Tuberculosis, 7 cases, autopsy; 6 + and 1 — subcutaneous.	18	.....	20 of this number = + clinical findings and 8 were +
	14	.....	14					
6. Necker and Paschkis[19]	19	.....	19	.....	Animal inoculation.....			
7. Bing[71]	19	.....	14	73.7	.....	5	26.3	
8. Warfield[34]	12	Adult.	11	.....	.....	1		
	143	.....	100	70	.....	43	30	

TABLE 2.—SUSPECTED TUBERCULOSIS

Author.	No. of Cases.	Age.	Reaction. Pos.	Reaction. Per Cent.	Control Diagnosis.	Reaction. Neg.	Reaction. Per Cent.	Control Diagnosis.
1. Pirquet[1]	23	Child.	5	.....	Autopsy + ...	18	.....	Autopsy, 15 negative.
2. Wolf[23]	90	5-13 23 adults.	47	52.2	27 of these suspect, 16 or 59.2 per cent. = + reaction; 25 or 92.5 per cent = +, 11 subcut. Pos. findings in 7 of above 27 by x-ray.	43	47.8	
3. Reuschel[30]	14	.....	14	.....	Pleuritis, serose, scrofula, clinical T. B. C.			
4. Bing[71]	36	.....	25	69	.....	11	31	
5. Warfield[34]	32	8-51	16	.....	.....	16		
Total	195	.....	107	55	.....	88	45	

TABLE 3

OTHER DISEASES, NON-TUBERCULAR

Author.	No. cases.	Reaction. Pos.	Reaction. Per cent.	Control Diagnosis.	Reaction. Neg.	Reaction. Pr. ct.	Control Diagnosis.
1. Pirquet[1]	16	..	16				
2. Olmer & Terres[70]	17	3	..		14	..	
3. Reuschel [30]	8	..	..	Autopsy leukemia..	7	..	Autopsy subcutaneous.
	18	1	..		18	..	
4. Necker & Paschkis[19]	23	1	..	Animal inoculation.	22	..	Animal inoculation.
5. Bing[71]	186	34	18.2		152	81.8	
Total	252	39	15		213	85	

TABLE 4

CLINICALLY NORMAL INDIVIDUALS

Author.	No. cases.	Reaction. Pos.	Reaction. Per cent.	Control Diagnosis.	Reaction. Neg.	Reaction. Pr. ct.	Control Diagnosis.
1. Pirquet[1]	..	..	35		..	65	
	..	..	2		..	98	
2. Engel & Bauer[60]	48	6	..	1 cut. T. B. C. 4— to subcut. test. 1 + to subacut.test.	42	..	
3. Baginsky[58]	19	12	..		7	..	
4. Warfield[34]	55	54	..		1	..	Mother T. B. C. Neg. to 5 and 10 mg. T. O. subcutan.
	51	15	..	Reacted to 1 mg. T. O. subcutaneous.	36	..	
	1	1	..				
	1	..	..		1	..	
	6	3	..		3	..	
Total	181	91	50		90	50	

70. Presse méd., Sept. 18, 1907.

71. Berl. klin. Wchnschr., March 16, 1908.

TABLE 5

CONJUNCTIVAL REACTIONS

POSITIVE TUBERCULAR

Author.	No. cases.	Reaction. Pos.	Reaction. Per cent.	Control Diagnosis.	Reaction. Neg.	Reaction. Pr. ct.	Control Diagnosis.
1. MacLennan[27]	25	23	..		2		
2. Kohler[72]	169	161	51		8	49	
					..	4.7	8% + to 4% O. T. 41% + to 2% O. T.
3. Maillet[37]	4	4					
4. Plehn[29] (see article)	38	31	81.6		7	18.4	
5. Cohn[9]	86	60	2	3 not in terminal stage.	26	2	
6. Colzolari[73]	12	3	..		9		
7. Wolff[23]	20	14	70	18 adults, 2 children.	6	30	Early 2d stage tubercular.
8. Webster & Kilpatrick[25]	43	43					
9. Letulle[74]	75	72	..		3		
10. Grasset & Rumdand[75]	7	7			1		
	1						
11. Proff	13	13					
12. Smithies & Walker[36]	29	29	..	1 after 1 and 5 mg. T. O. 1 slight after 1 1 mg. T. O. 2 marked after 1mg. T. O. 1 after 1, 5 and 10 mg. T. O.			
13. Baldwin[3]	53	50	..		3	..	1 miliary tuberculin; 1 tuberculin treated.
14. Schenck & Seiffert[47]	28	27	..		1		
15. Lenhartz	37	33	..		4	..	4 tuberculin treated.
16. Citron[79]	31	25	..		6		
17. Eppenstein[62]	85	60	..		25		
18. Mentoux [26]	15	14	..		1		
19. Schroeder & Kaufmann[24]	48	43	..		5		
20. Franke & Ratjen	6	6					
21. Andeoud[76]	13	12	..		1		
22. Blumel-Clarus[77]	289	260	..		29		
23. Calmette, Breton, Petit, Painblan and other authors[80]	111	108	..		3		
24. Comby[78] (children)	62	62	..	Clinical and autopsy 4+			
25. Bing[71]	6	3	50		3	50	
26. Citron[79]	36	70	81	+ without cachexia.	16	19	
	14	2	14.4	+ with cachexia....	12	85.6	
	15	14	93	+ not tubercular...	1	7	
27. Mentoux[26]	10	..	..	Children, 1st stage.	10		
28. Moro[3]	8	5	..	Percut. react. +7..	3	..	Percut. react.—1. Percut. react.—1. Percut. react.—3.
	12	12	..	Percut. react. 11 2d.			
	4	1	..	Percut. react. 1 3d.			
29. Heinemann[59] (1st, 2d, 3d)	25	20	..	1 case tubercular peritonitis, recovery; 1 case treated many months for cilat. lesion gave —reac. later.	..	..	3 cases init. hemorrhage.
	18	18	..		3		
	5	2	..				
30. Levi[22]	69	45	66		18	..	14 advanced; 4 not advanced or cachetic; 1 uniliteral tuberculous kidney; 1 tubercular prostate; 1 T. B. C. knee.
Total	1,572	1,352	86		214	14	

TABLE 6

SUSPECTED TUBERCULAR

Author.	No. cases.	Reaction. Pos.	Reaction. Per cent.	Control Diagnosis.	Reaction. Neg.	Reaction. Pr. ct.	Control Diagnosis.
1. MacLennan[27]	12	9	..		3	..	Clin. 1 tubercular hip 2 yrs. +2 react.
	12	10	..		2	..	10 mg. T. O. subcutaneous.
	20	19	..		1	..	Anim. inoc. sacral abscess.
2. Kohler[72]	5	2	..				
	..	3	..				
3. Cohn[9]	32	23	..		9	..	Not all negative to subcutaneous.
4. Wolff[23]	64	20	39.2	14 child. 50 adults. 80 to subcut.	43	61.2	
5. Webster & Kilpatrick[25]	58	36	..	Phys. Ex. +.....	18	18	Phys. ex. + .1 mg. O. T. bacilli in sputum 1 month previous.
	16	6	..	Phys. Ex.?.....	7	7	Phys. ex.?
6. Grasset & Rumdand[75]	5	5					
	3				3		
7. Proff	6	..	..		6	..	Babies born; tubercular mother.
8. Smithies & Walker[36]	6	6					
9. Baldwin[3]	26	8	..	Clinical	14	..	Clinical.
10. Schenck & Seiffert[47]	20	6	30	No positive physical findings.			No positive physical findings.
	..	6	30				
	..	3	15		5	25	
11. Lenhartz	63	23	..		40		
12. Citron[79]	14	11	..		3		
13. Eppenstein[62]	89	38	..		51		
14. Metraux	11	9	..		2		
15. Schroeder & Kaufmann[24]	9	4	..		5		
16. Franke & Ratjen	12	9	..		3		
17. Andeoud[76]	3	1	..		2		
18. Comby[78] (children)	70	..	..		70	..	Clinically, 6 autopsy.
19. Bing[71]	15	6	..		9		
19. Ctron[79]	18	10	55.5	Cliniel	8	44.5	
20. Mentoux[26]	3	3	..	Clinical			
21. Moro[3]	17	10	..	Percut. +16	7	..	Percut. react. —1.
22. Heinemann[59]	33	22	..		11		
Total	642	308	48		334	52	

72. Deutsch. med. Wchnschr., 1907, No. 50.
73. Riforma medica., July 26, 1907.
74. Bull. Soc. d. hôp. de Paris, Aug. 31, 1907.
75. Bull. Soc. d. hôp. de Paris, Aug. 31, 1907.
76. Bull. méd. 1907, xi, No. 20.
77. Med. Klin., 1907, No. 50.
78. Presse méd., 1907, No. 10.
79. Sitz. d. Berl. med. Gesellsch., July 24, 1907; Deutsch. med. Wchnschr., Feb. 20, 1908.
80. Compt. rend. Acad. d. Sc., July 7; la Presse méd., July 13, 1907, No. 56.

TABLE 7

OTHER DISEASES NON-TUBERCULAR

Author.	No. cases.	Reaction. Pos.	Per cent.	Control Diagnosis.	Reaction. Neg.	Pr. ct.	Control Diagnosis.
1. MacLennan[27]	20	4	..		16		
2. Maillet[37]	4	4	..				
3. Plehn[29]	5	2	..	Typhoid, acute articular rheumatism, acute bronchitis, scarlet fever, enteritis, pleurisy and pregnancy, rheumatism, reaction reappeared with return of rheumatism.	3		Typhoid, acute articular rheumatism, acute bronchitis, scarlet fever, pleuritis and pregnancy two weeks later.
	12	6	..		6		
	6	3	..		3		
	5	2	..		3		
	3	3	..				
	1	1	..		1		
	1	1	..				
4. Cohn[9]	192	10	..		182		
5. Calzolari[72]	19	..	..		19		
6. Letulle[74]	50	19	..		31		
7. Grasset & Rumdand[75]	14	..	..		14		
	1	1	..				
8. Smithies & Walker[36]	136	10	..		126		
9. Baldwin[8]	57	16	..	Clinical	41	..	Clinical.
10. Schenck & Seiffert[47]	52	3	57				
	..	11	22		26		Clinical.
	..	12	23	Clinical			
11. Citron[79]	45	1	..		44		
12. Eppenstein[92]	13	4	..		9		
13. Mentoux[26]	42	2	..		40		
14 Schroeder & Kaufmann[24]	20	12	..		8		
15. Franke & Ratjen	33	4	..		29		
16. Andeoud[76]	15	..	..		15		
17. Calmette, Breton, Painblan, Petit and other French authors[80]	87	1	..		86		
18. Moro[3]	25	6	..	Per cut. + 8	19		
19. Heinemann[59]	63	10	..		53		
Total	932	152	17		779	83	

TABLE 8

CLINICALLY NORMAL INDIVIDUALS

Author.	No. cases.	Reaction. Pos.	Per cent.	Control Diagnosis.	Reaction. Neg.	Pr. ct.	Control Diagnosis.
1. Maillet[38]	15	..	..		15		
2. Webster & Kilpatrick[28]	4	2	..		2		
3. Proff	17	..	..		17		
4. Smithies & Walker[36]	76	2	..		74		
5. Baldwin[8]	47	16	..	Not all physicians' findings	30		One reacted to a 2 per cent. solution which had been — to 10 mg. T. 0.
6. Bing[71]	79	1	1.2		78	98.8	
7. Citron[79]	100	6	6	Clinical	..	...	
8. Mentoux[26]	13	13	..	Clinical	..	...	
Total	351	40	11		311	89	

TABLE 9

TABLE OF SCHROEDER AND KAUFMANN

Author.	Positive Tuberculosis. No.	Pos.	Neg.	Suspected Tuberculosis. No.	Pos.	Neg.	Non-Tuberculous. No.	Pos.	Neg.
Lenhartz	38	33	4	63	23	40	11	4	7
Cohn	86	60	26	3	23	9	192	10	182
Citron	31	25	6	14	11	3	45	1	44
Kohler	169	161	8	5	5	..	..	..	..
Eppenstein	85	60	25	89	38	51	13	4	69
Baldwin	53	50	3	26	8	18	57	16	41
Metraux	15	14	1	11	9	2	42	2	40
Schenck-Seyffert	28	27	1	20	15	5	52	26	26
Andeoud	13	12	1	3	1	2	15	..	15
BlumelClarus	289	260	29	..	..	..	..	..	..
Calmette u. a. franz. authors	111	108	3	..	..	..	87	1	86
Schroeder-Kaufmann	48	43	5	9	4	5	20	12	8
						(Nor)	18	12	6
Franke Ratjen	6	6	..	12	9	3	33	4	29
Total	971	859	112	284	146	138	627	80	547
Per cent.		88.5	11.5		51.4	48.6		12.7	87.3

TABLE 10

CASES OF ENGELBACH AND SHANKLAND

POSITIVE TUBERCULOSIS

	Positive No.	Per cent.	Negative No.	Per cent.	Total.
Cutaneous	31	56.4	24	43.6	55
Conjunctival	52	74.3	18	25.7	70
Total	83	66.4	42	33.6	125

TABLE 11

SUSPECTED TUBERCULOSIS (OTHER THAN PULMONARY.)

	Positive No.	Per cent.	Negative No.	Per cent.	Total.
Cutaneous	30	55	25	45	55
Conjunctival	21	52.5	19	47.5	40
Total	51	54	44	46	95

TABLE 12

CLINICALLY PULMONARY TUBERCULOSIS

	Positive No.	Per cent.	Negative No.	Per cent.	Total.
Cutaneous	28	66.66	14	33.3	42
Conjunctival	15	28	38	72	53
Total	43	47	52	53	95

TABLE 13

OTHER DISEASES NON-TUBERCULOUS CLINICALLY

	Positive No.	Per cent.	Negative No.	Per cent.	Total.
Cutaneous	149	56.5	119	43.5	268
Conjunctival	102	24.4	315	75.6	417
Total	251	36.6	434	63.4	685

TABLE 14

CLINICALLY NORMAL INDIVIDUALS

	Positive No.	P.C.	Negative No.	P.C.	Doubtful No.	P.C.	Total.
Cutaneous	41	51	18	22.8	20	25.3	79
Conjunctival	18	25.5	46	65.8	6	8.6	70
Total	59	38	64	44.3	26	16.9	149

negative conjunctival reaction 67 days previous to death. One gave positive reactions to both tests 73 days before death.

From the above we conclude that in known tuberculosis the kind of reaction has no bearing on the prognosis of the case. Positive reactions have occurred with us as early as one day before death; both reactions have been present in variable percentage as long as three months previous to death. The negative reactions have practically equaled the positive reactions in occurrence two or three months previous to death.

UNTOWARD EFFECTS OF THE CONJUNCTIVAL REACTION

The evidence of accumulating cases has unquestionably proven that the conjunctival instillation of tuberculin is not entirely free from danger. On the contrary, from the following report one must conclude that there is a liability of producing severe inflammatory processes in normal eyes, of aggravating non-tuberculous affections of the eye, and of producing an extension, and in some cases a rapidly destructive process, in tuberculous affections of the eye, from its use. McKay[61] reports a severe conjunctivitis lasting over ten weeks in an eye that was normal previous to the instillation of a 1 per cent. solution. Eppenstein[62] reports three cases of conjunctival phlyctenular keratitis which were greatly exaggerated, and says that chronic hyperemia, blepharitis or conjunctivitis of any kind contraindicates its use.

Ferrien[63] reports a conjunctivitis lasting two months, which terminated by having the aspects of tuberculosis of the conjunctiva. Babier and Renon[64] have observed conjunctivitis persist for one or two months. Stevenson reported three cases of follicular conjunctivitis which existed from 20 to 40 days. Kalt[65] reports serious results in iritis, sclerokeratitis and iridochorioiditis. Trousseau[66] reports a marked extension of a tubercle of the conjunctiva immediately following the instillation of a 0.5 per cent. of tuberculin. In another case a tuberculous iritis was greatly aggravated, although the reaction was negative. Babier[64] reports keratitis and ulceration of the cornea from a conjunctival reaction. A large majority of other authors, not oculists, have observed more or less unfavorable results varying in degree and severity from this test.

Besides these local untoward reactions Wolff[23] observed a very marked febrile reaction in the conjunctival test. Wolff-Eisner[57] and many others obtained general reactions. Proff noted that the tuberculo-opsonic index was modified by these reactions, and that in some cases the negative phase was marked and unusually prolonged.

We wish to take this opportunity of expressing to senior house physicians, Dr. R. Bunch and Dr. F. Esselbruegge our appreciation for services rendered us in the preparation of this article.

CONCLUSIONS

The diagnostic value of these reactions in adults is restricted to many limitations:

1. The specificity of these reactions have as yet not been demonstrated.
2. The activity or extent of the lesion bears no definite relation to the degree or kind of reaction.
3. The conjunctival reaction is not free from danger.

61. Boston Med. and Surg. Jour., March 12, 1908.
62. Med. Klin., Sept. 8, 1907.
63. Bull. Soc. d'Ophth. de Paris, Oct. 8, 1907.
64. Bull. et mém. Soc. d. hôpitaux de Paris, Dec. 12, 1907.
65. Bull. Soc. d'Ophth. de Paris, Oct. 8, 1907.
66. Jour. de méd. et de Chir., Jan. 10, 1908.

THE CONDITION OF THE PERIPHERAL BLOOD VESSELS IN SHOCK*

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From a purely historical point of view the literature devoted to shock may be divided into three periods: 1, From 1795, when the word shock was first used as we now use it, down to the beginning of the era of experimentation in 1870; 2, the period from 1870 to 1885, devoted to careful experimental investigations; and, 3, from the reopening of the question by Crile in 1889 down to the present time. From 1885 to 1889 practically no papers other than purely casuistic ones appeared on the subject.

THEORIES IN REGARD TO SHOCK

The excellent summary published by Mansell Moullin[1] in 1882, and the encyclopedic volume contributed to the subject by Groeningen[2] in 1885 render it unnecessary to restate the historical development of the theme. It is of more than passing interest, however, to note that those views regarding shock which are most commonly accepted to-day differ but little from opinions published nearly half a century ago. It does not seem to be known generally that as early as 1864 W. W. Keen, S. Weir Mitchell and G. R. Morehouse[3] enunciated practically the same theory as that put forward by Crile nearly forty years later. I have been able to find only one reference to this work by Keen, Mitchell and Morehouse, and that reference was in a German monograph. The experimental work of Fischer[4] in 1870 confirmed the theory proposed by Keen, Mitchell and Morehouse, and set on a fairly firm basis the idea that shock was due to vasomotor exhaustion. Leyden,[5] however, took issue with Fischer and announced his belief to be that shock was due to a reflex inhibition of the activity of the centers of the cord. Meltzer,[6] in the most recent paper contributed to the shock question, practically coincides with the theory of Leyden. The theory recently expounded by Boise,[7] that cardiac exhaustion is the main underlying factor in shock, is a reiteration of the conclusion of Blum[8] published in the seventies.

It is in no disparaging sense that we emphasize the fashion in which old views have been rehabilitated. Indeed, we feel that every contribution that we have mentioned has been of of importance. Crile's[9] work, for example, furnishes the most comprehensive data ever contributed to the shock problem and has been instrumental in starting anew investigations as to the cause of one of the most dreaded surgical complications. Our purpose is rather to express agreement with Meltzer, when he says that despite all theorizing and experimentation, "the bringing forward of new experimental facts capable of shedding some more light on our puzzling problem is not yet a superfluous luxury."

Meltzer, in his paper, points out the fact that Crile fails to draw a distinction between surgical shock, with

* An Experimental Study from the Physiological Laboratory of St. Louis University Medical School.

1. Mansell Moullin, C. W.: International Encyclopedia of Surgery, London, 1882.
2. Groeningen, G. H.: Ueber den Shock, Weisbaden, 1885.
3. Circular No. 6, Surgeon-General's Office, 1864.
4. Fischer, H.: Samml. klin. Vortr. (Volkmann's), 1870, No. 10.
5. Leyden, E.: Samml. klin. Vortr. (Volkmann's), 1870, No. 2.
6. Meltzer, S. J.: The Nature of Shock, Arch. Int. Med., July, 1908, i, 571.
7. Boise, E.: Am. Jour. Obst., 1907; Tr. Am. Gynec. Assn., 1908.
8. Blum, A.: Arch. gén. de méd. de Paris, January, 1876.
9. Crile, G. W.: Blood Pressure in Surgery, Philadelphia, 1903; An Experimental Inquiry into Surgical Shock, Philadelphia, 1899.

rapid onset of symptoms, and traumatic shock, with slow onset of symptoms. This criticism makes it incumbent on anyone who deals with this problem to define his terms at the very outset. The term "shock" has assumed a medical significance so peculiarly its own that the primitive idea expressed by the word has almost been lost sight of. Originally "shock" signified a concussion or a blow, but toward the middle of the eighteenth century English medical writers began to use the word in explanation of the subtle and unexplained effects resulting from a severe blow or concussion. This latter use became so common that the word finally stood, not for the force itself, but for its resultant destructive tendencies.[10] The essence of this idea is so inherently bound up in the word that the French and German schools have been forced to adopt the word bodily, after numerous and futile attempts at translation by such terms as *impressionabilité extraordinaire, léthargie des blessés, épuisement par la doleur, résolution général des forces, syncope, Wundstupor, traumatische Torpor, Schuss-Erschütterung, Wundschreck, Neuroparalyse*, etc.

This difficulty in translation emphasizes a fundamentally important fact, namely, that the word represents an intricate symptom-complex and does not stand for a specific clinical actuality. The elder Gross[11] furnished the most graphic and satisfying description of this symptom-complex when he said that it was the manifestation of a rude unhinging of the machinery of life. It is confusing to adopt Meltzer's views regarding traumatic and surgical shock, for, after all, we assume that every type of shock results from trauma. Scientific accuracy will not admit the use of Howell's[12] classification of "cardiac" and "vascular" shock, for other vital functions besides the cardiac and vascular ones have been shown to be involved. So we shall use the word in the sense of an unhinging of vital machinery, bearing in mind that the onset of symptoms may be sudden or rapid, or at times insidious, and that either erethism or torpor may be characteristic symptoms.

As the problem stands to-day there are several contradictory theories. Crile and his followers maintain that vasomotor exhaustion is the primary cause of shock, Boise states that cardiac exhaustion is the prime cause, whereas Howell believes that both these factors (cardiac and vascular) must be reckoned with. Meltzer, after a critical survey of the literature, concludes that shock is consequent on the development of the inhibitory side of all the functions of the body. Kinnaman[13] argues for a disturbance of the thermogenic function, Jaboulay[14] for the formation of an irreducible oxyhemoglobin, Vale[15] for an increased specific gravity of the blood, Henderson[16] for the reduction of the carbon dioxid content of the blood and tissues (acapnia), Bainbridge and Parkinson[17] for a loss of chromaffin tissue following trauma, and Schur and Weisel[18] for a loss of this same tissue following the administration of volatile anesthetics.

Our object is neither to criticise these various theories nor to add a new theory to the already formidably long list. Cardiac excitation and inhibition, vascular dilatation and contraction, the modus operandi of the sympathetic nervous system, the complex phenomena of exhaustion and inhibition, would all have to be taken into account by a theory, despite the fact that not one of the factors that we have mentioned is understood fully.

This much is certain, however: that low blood pressure is a constant accompaniment of a pronounced degree of shock—so constant, indeed, that investigators practically always express the state of shock in terms of manometric pressure. We have based our experiments on the fact that the blood pressure is always low in shock, and we have set as our problem the determination whether the peripheral vessels are contracted or dilated during the time that the pressure is low in the larger, more centrally situated vessels, such as the carotids.

Mitchell, Morehouse and Keen, Groeningen and others assert that the peripheral vessels are not contracted, because, in the first place, no one has ever shown that they are, and, in the second place, because it is not probable that the peripheral vessels can be contracted tightly for any great length of time.

Crile argues that, consequent on vasomotor exhaustion, the peripheral vascular system is paralytic and, therefore, relaxed. Porter,[19] on the other hand, denies Crile's contentions *in toto*, and seems to show that the vasomotor center is not exhausted. Neither Crile nor Porter, however, directed their attention to the vessels themselves.

Malcolm[20] of London, dealing with the problem from a purely clinical point of view, makes two assertions: 1, that the peripheral vascular system is contracted in shock; and, 2, that a state of low blood pressure is thoroughly consistent with contracted peripheral arterioles. Malcolm makes an uncommonly strong clinical argument against the views of Crile in a fashion that refreshingly demonstrates the invaluable aid of clinical medicine to laboratory experimentation. If the theory of vasomotor exhaustion is correct, says Malcolm, then the network of smaller peripheral arterioles, being cut off from central control, must be relaxed. This relaxation should result in an overfilling of the vessels, but, as a matter of fact, all clinical evidence speaks against such an overfilling: the body surface is cold and pale, the mucous membranes are anemic, incisions made during the state of shock are almost bloodless, the radial pulse is often small to the degree of being impalpable, and the application of surface warmth tends to lessen the symptoms of shock, despite the fact that warmth usually relaxes vessels.

There are three possible ways of determining whether the peripheral vessels are dilated or contracted: 1, the vessels may be inspected visually; 2, the outflow of blood from an organ or extremity may be measured; 3, coincident variations in venous and arterial pressure may be measured. In our work, which has been done on dogs, we have used only the first two or three methods. We studied visually the vessels of the retina and measured the outflow from the femoral vein. We selected

10. It is interesting to note the beginning of a tendency to modify the character of the word again, so that in addition to signifying the destructive results of external force, it will also express the idea of constructive results. For example, Wetherill has published an article entitled "The Conservative Agency of Shock," THE JOURNAL A. M. A., March 12, 1908, xxx, 578. Furthermore, we find in recent biologic contributions, statements such as: "Mutation in species may be considered to result from a shock to the organism, the shock being stronger than normal hereditary impulses." In other words, shock enables the organism to construct something new, and possibly useful.

11. Gross, S. D.: System of Surg., Philadelphia, 1872, i, 426.

12. Howell, W. H.: Vaughan Festschrift, Ann Arbor, 1903, p. 61; Am. Med., 1904, p. 482.

13. Kinnaman, R. C.: Internat. Jour. Surg., 1904, p. 378.

14. Jaboulay, L.: Lyon méd., 1904, p. 378.

15. Vale, F. P.: Med. Rec., Aug. 27, 1904.

16. Henderson, Y.: Am. Jour. Physiol., 1908, p. 126.

17. Lancet, 1907, p. 1269.

18. Wien. klin. Wchnschr., Feb. 20, 1908.

19. Porter, W. T.: Am. Jour. Physiol., 1907-08, pp. 399, 444, 500.

20. Malcolm, J. D.: Lancet, 1905, i, ii, 573, 618, 737, 922; Med. Chir. Tr., 1908.

the eye as the site of visual inspection of the caliber of the vessels, because this is the only situation where the vessels can be studied without the necessity of exposing them by dissection. It is unnecessary to say that the caliber of a vessel that has been traumatized by dissection affords no reliable index of the caliber of that same vessel in an undisturbed state. We selected the femoral vein from which to measure the outflow because the circulation in the extremity is, in the strictest sense of the word, peripheral, and because the femoral vein is more accessible than is the axillary.

METHOD OF EXPERIMENTATION

Our procedure was as follows: Under Grehant anesthesia the carotid artery was connected to a recording manometer and the blood tracing started. Both femoral veins were dissected free, ligated where they leave the thigh to enter the abdomen, clamped just below this, and divided between ligature and clamp. Paraffined canulas were tied into the distal ends of the veins. Both sciatic nerves were dissected free at the posterior aspect of both thighs, and a bridle ligature was placed under each nerve so that it could be drawn out and divided with ease and rapidity. Only a minimal amount of fall of blood pressure resulted from this preliminary, as a rule.

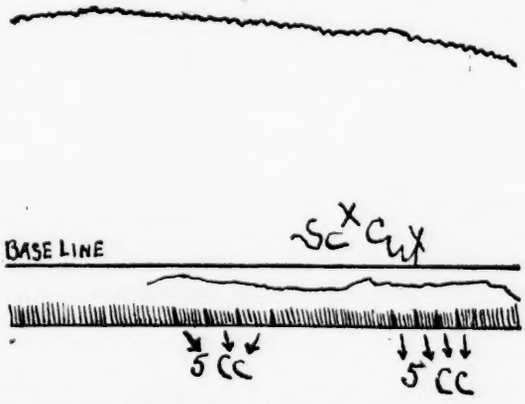

Fig. 1.—Tracing indicating outflow of blood in experiment on Dog 3. Moderate blood pressure. No evidence of shock. Division of sciatic (at ×) followed by more rapid outflow of blood from femoral vein. Time markings, 1 second.

The clamp was now removed from the left femoral and the blood allowed to flow through the canula into a tall glass graduate of moderately small caliber. After about 25 or 30 c.c. had flowed out and the current of blood was running smoothly and evenly, readings were begun in order to note the rapidity of the flow. The method of making these readings was as follows: At the moment the reading was begun an electric button connected with the second-time marker was pushed. After 5 c.c. of blood had flowed the button was pushed again, and this was repeated at the completion of the flow of each fifth cubic centimeter of blood until the time record on the drum showed four or five periods, each one representing the time flow for 5 c.c. of blood. Then the left sciatic nerve was severed and, after waiting a short while for the flow to steady, the time flow for 5 c.c. was recorded several times. The animal was then reduced by a state of shock, by manipulation and chilling of the abdominal viscera, and after the blood pressure showed a permanent fall, the blood flow was measured from the right femoral vein, just as it had been from the left one, before and after section of the right sciatic nerve.

The vast majority of vasomotor impulses that reach the blood vessels of the hind leg of a dog travel through the sciatic nerve; therefore, as is well known, severance of this nerve results in vasodilation in the extremity, and consequently in a more rapid flow of blood from the femoral vein. This point is illustrated by the tracing shown in Figure 1. Before the sciatic was cut it took seven seconds for 5 c.c. of blood to flow out, whereas after the sciatic was divided the same quantity of blood flowed out in five seconds. The crux of these experiments lay in the rate of outflow after the animal was reduced to a state of shock, for if in profound shock the vessels are beyond the control of the vasomotor centers, then severance of the sciatic nerve ought not to make any appreciable difference in the rate of flow. All our experiments showed that the proportional rate of flow from the vein was more rapid after division of the sciatic in a shocked animal than it has been from the opposite veins before the animal had entered the state of shock. Figure 2 is a continuation of the tracing shown in Figure 1, taken from Dog 3 of our series. This portion of the tracing represents a period when the animal was in a profound degree of shock. It will be noted that before the sciatic was divided it took nineteen seconds for 5 c.c. of blood to flow, whereas after section of the nerve it required only eleven seconds. This shows that the intact sciatic must have been transmitting impulses that were maintaining vascular tone. More than this, the proportionately more rapid flow[21] can not be due to an actually greater dilatation of the vessels in one instance than in the other, because in both instances we have a maximal dilatation consequent

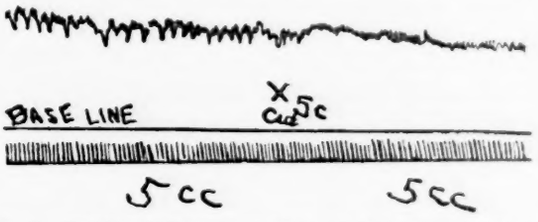

Fig. 2.—Tracing indicating outflow of blood in experiment on Dog 3. Very low blood pressure. Animal in profound shock approaching *exitus lethalis*. Division of sciatic (×) followed by a proportionately more rapid outflow from femoral vein than in Fig. 1. Time markings, 1 second.

on severance of the nerve. It must be due to the fact that during shock the vessels (arterioles and capillaries) are more contracted than they are before the animal shows the effects of trauma. It must be borne in mind clearly that these experiments do not show anything more than that the division of the sciatic nerve of a shocked animal causes dilatation of the vessels of the leg, just as it does in a normal animal. This dilatation, however, is proportionately greater than that which occurs in the normal animal, and this proportional difference must be referred to the fact that in the shocked animal, before division of the sciatic, the vessels are in a state of greater contraction than they are in the normal animal.

Two reasonable objections may be made to our results, on the ground, first, that the time measurements were not accurate in the strictest scientific sense, and, second, that the anterior crural nerve was not severed so as to cut off all possible vasomotor impulses to the leg. As

21. In the normal animal, the rate of flow before and after division of the sciatic was 7 to 5, whereas in the shocked animal the rate was 19 to 11. These two sets of figures demonstrate a proportionately more rapid outflow in the shocked animal.

regards time measurements, they were not taken automatically and were, therefore, not true to a fraction of a second. Repeated experiments, however, demonstrated that this source of error was minimal, and, furthermore, our object was not to measure the exact time rate. We did not sever the anterior crural, because we found this procedure to be unnecessary. Our object was not to cut off all impulses, but to block out most of them.

The task now remains to confirm by visual inspection the statement that the peripheral vessels are contracted. For reasons already stated, we selected the retina as our field for this part of our work, and we are indebted to Dr. John Green, Jr., for our ophthalmic reports. Unfortunately, we failed in efforts to devise a scheme for measuring, with absolute accuracy, the diameters of the retinal vessels. In order that Dr. Green might not be prejudiced by the facts already secured by us, he was not told about them, being merely requested to examine the fundi of the dogs' eyes, before and after shock was induced, and to note carefully the size of the vessels. He took the size of the optic disc as his standard and compared the size of the vessels with it. In every instance he reported that the vessels showed a marked degree of contraction after the animal was in shock. The vessels contracted down to from one-third to one-half of their size before shock.

Two observations were particularly interesting: In one case the dog died immediately after an examination of the fundus which had disclosed marked contraction of the vessels, thereby demonstrating that vasoconstriction persisted up to the very point of *exitus lethalis*. Unfortunately, we neglected to examine any of the fundi after death in order to see if vascular relaxation occurred. The second observation of especial interest was a case in which the retinal vessels were contracted so tightly as to make them resemble mere strands. In this connection it is interesting to note that ophthalmic literature contains at least two reports[22] of sudden blindness occurring during shock, lasting from two to five hours, and then passing off without leaving any demonstrable eye changes or disturbances of vision. Roberts, who makes these reports, does not give the fundus findings during the state of shock, nor does he attempt to explain the cause of the blindness; but it seems fairly reasonable to assume that the occurrence of a sudden acute anemia of the retina, resulting from pronounced contraction of the retinal vessels, might cause transient blindness.

CONCLUSION

In conclusion it is important again to emphasize the fact that the experimental work detailed in this paper is in no sense of the word to be taken as an explanation of the causative factor or factors of shock. Just as Porter claims to show explicitly that in shock the vasomotor center is not exhausted and, therefore, implicitly that the peripheral vessels are not paralyzed, so we try to show explicitly that the peripheral vessels are contracted, and implicitly that not all the vasomotor centers can be exhausted. The complexity of the vasomotor apparatus with its multiplicity of centers, and the seemingly independent action of many of these centers, render it impossible to frame a satisfactory theory based on our results. This much may be said with assurance: If the work herein detailed stands the test of confirmation, then the doctrine that shock is due to vasomotor exhaustion must be revised.

22. Roberts, W. O.: Am. Pract. and News, 1907, p. 24.

Clinical Note

A TYPHOID BACILLUS CARRIER

HISTORY AND AUTOPSY

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Since the comparatively recent discovery of what may be termed latent typhoid infection and its bearing on the spread of the disease, as well as its pathologic and bacteriologic significance, additional examples of this condition have been reported repeatedly.

As yet, however, the number of postmortem examinations of bacillus carriers has not been large, and the present instance is cited, not only as an example of the possibilities of transmission of infection under certain circumstances, but as an additional confirmation of the generally accepted belief in the origin of the bacilli in such cases.

HISTORY OF A BACILLUS CARRIER

The individual in question was a colored man admitted as a patient to the New Jersey State Hospital at Trenton in 1902. He was at that time sixty-seven years old, and presented then, or subsequently, nothing beyond the gradual mental and physical failure incident to his age, and was able to perform such light work as was assigned him.

During July and August, 1907, the institution was visited by an epidemic of typhoid fever, due to the contamination of a spring from a leaking city sewer, over one hundred cases resulting, with the usual mortality.

The patient (C.C.) then seventy-two years of age, became ill early in August, and responded positively to the agglutination test on the 13th. The course of the disease was exceptionally mild; the temperature was at all times low, rarely above 100 F.; and there were few, if any, subjective or objective symptoms, so that, in spite of his age and comparative weakness, the patient was able to be about in a little over three weeks from the time of onset. Indeed, so mild was the disease that the diagnosis was made entirely on the Widal reaction, this test being made at this time on all patients showing any signs of ill health whatever. In the absence of an epidemic it is probable that the few symptoms observed would have given no indications of the condition.

He made an uneventful recovery, and very quickly regained his usual health..

During the fall and winter (1907), following the epidemic, bacteriologic examinations of the urine of all convalescent patients (including C.C.) were made at the hospital laboratory, three examinations each of fifty-two convalescents being performed. Digalski-Conradi agar medium was used for this purpose, and in no instance were suspicious organisms isolated.

All patients were at this time kept segregated after having had typhoid and hexamethylamin (urotropin) systematically administered over a period of months. Subsequent to the urine examinations, in the spring of 1908, the Research Laboratory of the New York Health Department, under the direction of Dr. W. H. Park, undertook the examination of the feces of the same individuals, samples being sent to New York for this purpose. Three or more examinations of specimens from each patient were made, and, as already reported by Dr. Park,[1] two bacillus carriers were discovered, one being the patient C. C. Four consecutive fecal examinations of this patient during March and April each showed typhoid bacilli in large numbers. He was at once isolated and rigid disinfection of all discharges carried out. No further cases occurred. It is here of interest to note what would have been the inevitable consequences, had not these individuals been recognized.

1. Park, William: Typhoid Bacilli Carriers, THE JOURNAL A. M. A., Sept. 19, 1908, li, 981.

As is now generally conceded, the opportunities and frequency of contact typhoid infection under ordinary circumstances are great, but in large institutions, particularly for the insane, these are enormously multiplied.

Where large numbers of patients are in close daily contact in dormitories, wards and dining rooms, many of whom from their mental condition are careless or filthy in their habits, the direct transference of infection, in spite of all ordinary precautions and watchfulness, is unavoidable. Nieter and Liefmann, in 1906, reported a series of typhoid outbreaks in an insane asylum due to this cause, and Friedel in the same year cites another instance in which sixty-three cases resulted in another similar institution. Liebtrau speaks of an attendant in a jail who caused four cases, but who had herself never been ill.

Following his isolation, the history of C. C. was uneventful, and nothing of note in his physical condition was observed up to his last illness, with the exception of a trifling and irregular diarrhea, alternating with mild constipation.

Although the gall bladder and small intestine were found involved at autopsy, no essential symptoms of these conditions were observed during life. C. C. continued in his usual condition, though gradually failing in strength from old age, up to within six weeks of his death when he developed an irregular temperature, accompanied by signs of thoracic disease, became progressively weak and emaciated, and died Oct. 16, 1908, one year and three months after having had the attack of typhoid.

AUTOPSY

The autopsy was performed three and a quarter hours after death. Nothing beyond a senile appearance and rather marked emaciation was noted externally. The brain was typical of senile atrophy, and close inspection of the pia failed to detect anything except the usual changes of this condition, though microscopically an interesting condition was discovered. The left seventh rib was found detached from the vertebra at the articular process, and the severed ends were surrounded by a small pocket of thick yellow pus.

The left pleura was enormously thickened, and the lung deeply engorged and firmly attached to the chest wall. The upper lobe of the right lung showed lobar consolidation, and the heart a rather severe grade of brown atrophy. The aorta and other large trunks were sclerotic and contained a moderate number of atheromata. The spleen was small, tough and fibrous, but macroscopically showed nothing further. The liver was small, mottled in appearance, uneven on the surface and thickly studded with minute grayish solid bodies and fasciculi taken at autopsy to be fibro-connective tissue.

On making a minute opening in the gall bladder for the purpose of taking cultures, a small amount of clear mucoid bile escaped; the rest of the bile, however, which completely filled the gall bladder, was dark yellowish brown, thick and partially inspissated. A dark greenish-black, smooth oval calculus, 1.5 by 0.5 cm., was present; and the mucosa was very dark and slightly thickened. The cystic, hepatic and common ducts were unobstructed.

There was a well-marked chronic interstitial nephritis, and one kidney contained a small sclerotic nodule at the junction of the cortex and medulla. The mucosa of the bladder was slightly injected, but otherwise negative.

In the intestine there were irregular areas in which the mucosa was mildly injected, and two small ulcers were found, each about 0.5 cm. in diameter. One was situated in the lower portion of the ileum, the other in the cecum. Both were circular, sharply circumscribed, involved the mucosa only, and showed complete absence of induration or surrounding reaction.

It was thought that, anatomically, we were dealing with a possible traumatic fracture of the seventh rib with secondary infection and involvement of the left pleura, a chronic senile leptomeningitis, fibroid spleen, and a rather marked chronic interstitial hepatitis.

On microscopic examination, however, the thickened pleura was seen to contain many characteristic giant cells, and the liver and spleen were studded with numerous and closely set minute miliary tubercles, while the pia was the seat of the earliest stage of tuberculous meningitis. In fact, there had been a rapid and general dissemination of acute miliary tuberculosis, probably arising from a necrotic rib.

Whether this was primarily a post-typhoid necrosis secondarily infected with tubercle bacilli remains in doubt, though from its apparent comparatively recent occurrence this was probably not the case.

BACTERIOLOGIC EXAMINATION

Cultures were taken on lactose litmus agar from the region of the intestinal ulcers, the liver and bile. The latter were made in definite decimal dilutions from 1 to 0.00001 c.c., using sterile water as a diluting fluid, and incubated at 37.5 C.

On the plates made from the intestinal ulcers many red colonies developed, chiefly of the colon group, but none showed any resemblance to typhoid organisms, either on the plates or by subcultivation.

In twenty-four hour observations of the bile plates no colonies whatever could be distinguished on those made from the undiluted bile, or on the dilutions up to 0.0001 c.c., although a very delicate film appeared to cover the surface of the medium, which was unaltered in color. On the 0.0001 plate innumerable minute blue points could be distinguished with a hand lens, while on the plate of highest dilution (0.00001) an enormous number of distinct delicate bluish colonies could be seen, all of which were identical in appearance. It was impossible to count the colonies accurately, but it was estimated that they numbered between 1,500 and 2,000.

The plate cultures made from the liver by smearing a small bit of excised tissue over the bottom of the plate before pouring the agar, showed identical colonies varying in numbers from 100 to 1,000 on each plate. About twenty of the colonies from the bile and liver were subcultivated and tested for agglutination with a known typhoid serum tested against a stock culture of typhoid bacilli. The reaction was prompt and vigorous in dilutions of 1 to 50. A number of stains were then selected and subjected to cultural tests the results of which corresponded in every instance to those of *Bacillus typhosus*.

In stating the probable number of typhoid bacilli present in the bile in this instance, only approximate figures can be given, since the enormous overgrowth even in the highest dilution, obviously places the numbers too low, but as a conservative estimate it is safe to say that there were at least 20,000,000 per c.c., basing the estimate on the number of colonies developing on the least crowded plate.

The numbers developing in the liver cultures were correspondingly large, although from the nature of the material it is impossible to give these in as definite a manner as with fluids such as bile.

That the bacilli are found in the liver when present in the gall bladder is shown by the case reported by Levi and Kayser, who at autopsy of a bacillus carrier found them in the wall of the gall bladder, the liver and inside of calculi. In this instance the autopsy was performed nineteen hours after death, and the findings suggest that the bacilli invade the liver, postmortem, through the bile ducts.

This is believed to be the case in the present instance, for although tubercle bacilli were readily demonstrated in sections of the liver fixed in alcohol, the most careful search failed to detect the presence of either colonies or isolated bacilli in any portion of the liver tissue examined.

In an autopsy cited by Nieter and Liefmann, in 1906, they found not only the gall bladder involved and containing the organisms, but also a chronic catarrh of the lower intestine and many typical old typhoid ulcerations. This patient had suffered from chronic dysentery during life.

In the present case the patient also showed a mild catarrhal condition of the intestine, and ulcerations were present, but in no way did either lesion resemble a long-standing or chronic condition, nor were the ulcers of a nature to suggest a typhoid origin; and from the appearance of the lesions, rather than the failure to cultivate typhoid bacilli from them, they are regarded as unconnected with the infection of the gall bladder or the presence of the bacilli in the stools.

SUMMARY

The points of interest in the present case are:

The race and age of the individual (73 years at time of death).

The extreme mildness of the primary disease.

The constant presence of the organisms in the stools and their absence in the urine, following the attack.

The apparent failure of progressive and, toward the last, severe senile changes, together with an intense and widely disseminated tuberculous process to influence the course of the chronic typhoid infection.

The enormous numbers of the organisms found in the gall bladder and liver at autopsy.

The futility of hexamethylamin as a treatment for typhoid infection of the gall bladder.

And, finally, the extreme value of fecal examination of post-typhoid subjects in institutions where control is possible and the practice of rigid isolation and disinfection when carriers are discovered.

I am indebted to Drs. Sandy and Taylor of the State Hospital, under whose care the patient was, for the clinical facts, and to Dr. W. H. Park for the reports of the fecal examinations.

Therapeutics

ASTHMA

(*Continued from Vol. LI, page 2160*)

The best treatment of the paroxysm of asthma must be decided by a careful study of each individual patient. There is no one best treatment for the asthmatic attack. The drug that most frequently is successful in rendering the patient comfortable and shortening the paroxysm is, of course, morphin, but before the physician begins the treatment of the asthmatic attacks with morphin he should have exhausted his other resources, as he is not sure that he can cure the asthma, even if he removes the reflex cause, and such patients readily acquire the morphin habit. If a given patient is incurable under the surroundings and conditions in which he must live and no other drug will relieve his suffering, he doubtless has the right to receive morphin, even if he does form the habit.

In endeavoring to abort or shorten the attacks we may have recourse to the narcotics, which relieve the paroxysm by inhibiting the reflexes and dulling the receptive centers. Such drugs are morphin, bromids, chloral, and chloroform by inhalation.

Lobelia is depressant both to the circulation and to the nervous system, and can only be of value in sufficient dose to cause actual depression. It acts similarly to chloral and bromids, and probably no better.

Grindelia robusta depresses the circulation and depresses the nervous system, and is a narcotic. It also dilates the pupils. Consequently the action is not very dissimilar to chloral. It has often been used in bronchitis and asthma and in whooping cough to relax or prevent spasm. It has no advantage over chloral or bromids.

We may use drugs that dull the peripheral nerves and prevent their susceptibility to the irritation from which they are suffering and thus abort the paroxysm. Such drugs are mostly of the atropin group, as belladonna, stramonium and hyoscyamus. The effective action is atropin action, and doubtless atropin, and perhaps scopolamin (hyoscin) will do all the good that the crude drugs can do, although inhalation of the fumes from burning stramonium leaves has been used with success for centuries.

We may consider the treatment with such drugs as cause muscular relaxation by prostration. Such are emetics, and nicotin with patients who are not used to its action.

The next group of drugs whose action we consider in the treatment of asthmatic attacks are vasodilators. These drugs not only dilate the peripheral blood vessels and therefore relieve congestion in the mucous membranes of the respiratory tract, but also are preventers of muscular spasm. Such are, of course, the nitrites in the form of amyl nitrite, sodium nitrite, and nitroglycerin. The iodids will also cause lowered blood pressure, but are hardly of value during the attack.

Many times quite the reverse of this dilating, relaxing treatment is indicated in an asthma paroxysm. The vasoconstrictors are indicated, and if used in these instances will abort the attack. The best are suprarenal solutions sprayed on the mucous membranes of the nostrils or throat, or into the larynx, or a suprarenal or adrenalin tablet may be dissolved and absorbed in the mouth. The action is of course immediate, and sometimes so is the relief. For the nostrils adrenalin spray solutions of from 1 to 10,000 to 1 to 5,000 (diluting with a mild alkaline solution) may be used. In the throat and larynx a strength of 1 to 3,000 may be used. Digitalis is sometimes of advantage in these attacks even if there is no cardiac lesion or cardiac debility. Intramuscular injection of an aseptic preparation of ergot is also sometimes efficient treatment in stopping the paroxysm.

Citrated caffein, or strong coffee, or strong decoctions of tea are of benefit during the asthmatic attack in some individuals. The favorable action of caffein must be due to the cardiac stimulation and possibly to stimulation of the respiratory center.

Strychnin given hypodermatically has been much recommended for the asthmatic attack. While it generally fails, it sometimes does a great deal of good to patients who have bad heart action. A combination of strychnin, morphin, and atropin given hypodermatically sometimes seems to act better than when the strychnin is omitted. Arsenate of strychnin in doses of perhaps 1/40 of a grain three times a day has been recommended in chronic asthma. This drug is very active and may cause unpleasant symptoms.

Almost from ancient times paroxysms of asthma have been treated by the inhalations of fumes from burning medicinal substances. For this purpose the medicated substance may be in the form of cigarettes, powder, cones, or papers. Sometimes the fumes of these burning powders are directly inhaled, or the patient's bedroom is allowed to become filled with the fumes. Sometimes the attack is relieved by the inhalation of steam, or the vapor of boiling water in the room of the patient adds some relief. Sometimes liquid medicaments are

added to boiling water in various apparatus for inhalation. Most popular, however, and most frequently used are the powders or papers, or pastils that are burned near the patient's face and inhaled directly.

Probably nearly all the powders or papers ordered by physicians for inhalation for asthma and almost all of the patented preparations and nostrums contain niter (saltpeter) and stramonium, or belladonna, or other atropin-containing drug. The action of the niter, i. e., potassium nitrate, fumes is to cause relaxation both of the blood vessels and of the bronchi. Papers are saturated with solutions of potassium nitrate, and when dry may be rolled in the form of a cigarette and smoked, or may be burned in any other form, and the fumes are beneficial to some patients. The addition of potassium nitrate to other medicinal powders causes them to burn more readily and give off their fumes.

Stramonium (leaves) is the most frequent form in which the alkaloid atropin is administered by inhalation. The action of the atropin thus locally applied is to dull the irritability of the peripheral nerves in the nose, throat and larger bronchial tubes, and thus by relieving irritation tends to relieve spasm. At the same time the atropin acts as a circulatory stimulant.

Various combinations of drugs are used for inhalation for asthmatics, many of which are nostrums (but have been analyzed) and have more or less efficiency in relieving the attack, because of the potent drugs often recklessly employed. The asthma nostrum vendor is looking mainly for immediate results, and he cares little what the danger to the patient may be or how strong a dose he gives; consequently, he orders used sufficient amounts of the drugs to cut short the asthmatic attack. Therefore, the prescription which a physician is willing to write may not be so successful in a certain case as the nostrum temporarily may be.

A French asthma cigarette contains the following ingredients.

Belladonna leaves	5½ parts
Hyoscyamus leaves	2¾ parts
Stramonium leaves	2¾ parts
Phellandrium aquaticum	1 part
Extract of opium	⅛ part
Cherry laurel water	A sufficiency.

—(Yeo).

The dried leaves are cut small, mixed well, and moistened with the opium which has been dissolved in the cherry laurel water. A small amount of potassium nitrate is added in order that the cigarettes may burn readily.

Some patented preparations contain lobelia, and something similar to Himrod's cure is as follows:

> "Powdered lobelia.
> Powdered black tea,
> Powdered stramonium leaves, each one ounce.

On this is poured two ounces of a saturated solution of potassium nitrate, which is thoroughly mixed and allowed to dry" (Yeo). Portions of this are then burned and the patient inhales the fumes. Certainly a great deal of cardiac depression may take place from the use of such strongly medicated inhalants.

Arsenical cigarettes also have been used by asthmatics, sometimes beneficially. Yeo says that "these are made by dissolving 15 grains of arsenite of potash in half an ounce of distilled water and saturating unsized paper with it. This is afterward dried, cut up into twenty pieces, each of which is rolled up into a cigarette. The smoke from the cigarette must be drawn into the bronchial tubes by a slow inspiration." It certainly is not obvious how arsenic can shorten an asthmatic attack. The administration of arsenic in small doses for some time may prevent the development of asthma, and chronic bronchitis is sometimes benefited by the prolonged use of arsenic.

Oxygen inhalations have sometimes been used by asthmatics, and with relief. This, however, is not very dissimilar to breathing the outside air, and will, of course, partly relieve the oxygen starvation. A patient who must go to the window and gasp for breath should, perhaps, have an oxygen tank in his room to use when he needs it.

It has been suggested (E. L. Smith, *Medical Record*, June 29, 1907) that some of the good effects of the inhalation of niter and stramonium are due to the vasoconstriction that the irritation of the fumes causes in the asthmatogenic areas, these being mostly in the nostrils.

There are various combinations of potassium nitrate, powdered stramonium, belladonna, and hyoscyamus leaves with aromatics, and anise seems to be the preferred spice.

The following is an example:

℞.	gm.		
Potassii nitratis	15		
Pulveris anisi	15	or	āā, ℥ss
Pulveris stramonii	30		℥i

M. et fac pulverem.

Sig.: Ignite a thimbleful of the powder and inhale as directed.

Many inhalants for asthma contain cocain, but these are probably mostly solutions for nebulizing.

Tucker's remedy was analyzed and modified by Einhorn and Schafer (*Münch. Med. Wochschr.*, 1907, Nos. 27-28). The following is their formula:

℞.	gm.		
Cocainæ nitratis	1		gr. xv
Atropinæ nitratis	50	or	gr. viiss
Glycerini	30		fl.℥i
Aquæ	60		fl.℥ii

M. et sig.: To be used in a nebulizer.

The spray from such a solution is certainly active, and it would seem unsafe to use it in large quantities. The best method would probably be to spray the nostrils or perhaps throat for a moment or two and then wait fifteen minutes and spray again, and perhaps again repeat if necessary. The immediate success of such treatment is, of course, entirely due to the cocain, and were it successful would demonstrate areas in either the nostrils or the throat that were the irritant or exciting cause of the asthma. Any patient who had frequent attacks of asthma and used this treatment is in danger of developing the cocain habit.

Cocain certainly entered into the constituency of many of the nostrums for the cure of hay fever and asthma, but not as many now as formerly, since most states compel the label to declare that cocain is present. Patients having learned to be more or less fearful of cocain do not buy the nostrums so readily, unless they have already acquired the habit. Consequently cocain has been taken out of many of the patented medicines.

If we were to sum up the best treatment for the paroxysm of asthma we must say morphin and atropin hypodermatically, the administration of nitroglycerin by the mouth, adrenalin or other suprarenal sprays into the nostrils or throat, or tablets containing suprarenal dissolved in the mouth, fumigations with potassium nitrate and stramonium, and cocain applications and sprays, if must be.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

103 DEARBORN AVENUE . . . CHICAGO, ILL.

Cable Address . . . . "Medic, Chicago"

Subscription price . . . . . Five dollars per annum in advance

[*For other information see second page following reading matter*]

SATURDAY, JANUARY 2, 1909

DEATHS OF PHYSICIANS IN 1908

During 1908 the deaths of 2,261 physicians in the United States and Canada were noted in THE JOURNAL, the equivalent of an annual death rate per thousand of 17.39, based on an estimate of 130,000 practitioners. This rate does not differ materially from those of the previous six years, which were, respectively: 1907, 16.1; 1906, 17.2; 1905, 16.36; 1904, 17.14; 1903, 13.73, and 1902, 14.74. The age at death varied from 21 to 102 years, the average being 59 years, 6 months and 25 days. The number of years of practice of the decedents varied from the first year of practice to the seventy-sixth, the average being 30 years and 5 months. About 14 per cent. of those who died were members of the American Medical Association. Chief among the death causes were heart disease, violence, pneumonia and cerebral hemorrhage, in the order noted.

Causes of Death.—During the past year 335 deaths were assigned to general diseases; 269 to diseases of the nervous system; 288 to diseases of the circulatory system; 201 to diseases of the respiratory system; 79 to diseases of the digestive system; 109 to diseases of the genitourinary system, and 175 to violence. Among the chief assigned death causes were heart disease, 222; pneumonia, 172; cerebral hemorrhage, 171; accidents, 129; nephritis, 107; senile debility, 79; tuberculosis, 67; malignant disease, 51; typhoid fever, 37; suicide, 34; septicemia, 33; angina pectoris, 36; appendicitis, 25; diabetes, 23; influenza, 15; homicide, 12; gastritis, 11; tetanus, 4, and glanders, 1.

Of the 175 deaths from violence, 126 were due to accident, 34 to suicide and 12 to homicide. Of the accidents, falls caused 22 deaths; poison, 17, and gunshot wounds and railway accidents, each, 12; 10 were drowned; 9 died from burns; 8 from runaways, and 7 from automobile casualties. Of the 34 suicides, 20 were due to gunshot wounds; 6 to poison; 3 to cutting instruments; 2 to asphyxiation, and one each to drowning, fall and strangulation. All of the 12 homicides were due to gunshot wounds, and 4 of these occurred in duels or as the result of feuds.

Ages.—Of the practitioners who died, 87 were between the ages of 21 and 30; 255 between 31 and 40; 310 between 41 and 50; 386 between 51 and 60; 450 between 61 and 70; 405 between 71 and 80; 175 between 81 and 90; 14 between 91 and 100, and 2 exceeded the century mark. The greatest number of deaths occurred at the age of 66, when 53 were reported, and 58 and 68, at each of which ages 50 deaths were reported.

Years of Practice.—During the first decade of practice, 259 died; during the second, 408; during the third, 467; during the fourth, 429; during the fifth, 345; during the sixth, 254; during the seventh, 54. Three practitioners exceeded 70 years of practice, one attaining 76 years.

Military Service.—During 1908, 353 practitioners died who had seen service in the Civil War, 99 of whom had served in the army of the Confederate states; 15 died who had served in the Spanish-American War; 9 in foreign wars, and 3 in the Mexican War. There were 25 deaths of past or present members of the Medical Corps of the Army; 13 of the Medical Department of the Navy; 11 of the Public Health and Marine-Hospital Service, and one death in the newly established Medical Reserve Corps. The deaths of 15 National Guard surgeons are reported, 5 of whom had attained the rank of surgeon-general.

Medical Positions.—During the year medical colleges lost 109 professors and instructors; hospitals, 250 members of staffs; counties and cities, 122 health officers, and boards of education and school boards, 71 members. There were 44 deaths of coroners, 81 of pension examiners, 93 of railway surgeons, and 26 of members of state boards of health or of medical examination. Of the physicians who died, 15 had served as state senators, 47 as members of the legislature, 24 as mayors, 10 as councilmen, 59 as justices of the peace or in civil offices, 29 as postmasters, and 37 as editors.

Among the more prominent dead of the year are:

Nicholas Senn, master surgeon, pathologist and teacher.

Richard Douglas, Nashville, distinguished surgeon, gynecologist and abdominal surgeon of the south.

Daniel Bennett St. John Roosa, New York City, ophthalmologist.

Thomas Edgar Schumpert, Shreveport, prominent surgeon of Louisiana.

James Coe Culbertson, Cincinnati, former editor of THE JOURNAL and prominent in educational work.

Frank Hugh Montgomery, Chicago, specialist on diseases of the skin and venereal diseases.

George Michael Edebohls, New York City, gynecologist and abdominal surgeon.

Charles Harrington, Boston, orator in state medicine, sanitarian, hygienist and administrator of the highest grade.

Frank Lemuel Adams, Oakland, Cal., formerly president of the state society.

Andrew J. McCosh, New York City, prominent general surgeon of the east.

THE ORIGIN OF THE BEAT OF THE HEART AND ITS CONDUCTION THROUGH THE HEART

It seems possible that the two hypotheses known respectively as the myogenic and the neurogenic theory of the rhythmicity of the heart beat may at last coexist on friendly terms. Recent work tends in this direction, as it seems to grant to the neurogenists the control of the heart, and possibly also the origin of the impulse which results in a beat, and to the myogenists the path of conduction of this impulse.

Based originally on the assumption that the conduction of an impulse passing from the atrium to the ventricle accounts for the difference in time between the atrial and ventricular systoles, the myogenic theory was substantiated in 1893 by the younger His.[1] His researches and Retzger's[2] more complete work later demonstrated the path of conduction of this impulse — a muscle bundle connecting the atrium and ventricle through the atrio-ventricular septum. The production of independent atrial and ventricular contractions by Gaskell[3] and by Wooldridge[4] as early as 1883 by constriction or destruction of the muscle at the atrio-ventricular junction had thrown light on the physiology of this path before its anatomic discovery, and His[5] in 1895 reproduced the same dissociation of atrial and ventricular contractions simply by destroying the muscle bundle described previously by himself. It remained, as is now well known, for Erlanger[6] to show that the syncopal attacks and slow pulse of the Adams-Stokes syndrome are due to a similar heart-block—to interruption of the function of this atrio-ventricular bundle of His.

Recent observations of Arthur Keith[7] of London have shown, in the junction between the great veins and the atrium of the heart, a bundle of muscle fibers which ramify about the atria and are lost in the septum. This is probably a path of conduction, and its existence is evidence in favor of the view that the venous portion of the heart forms the site of origin for the rhythmic impulses. The presence in it of many ganglion cells and nerve fibers suggests that it may be the connecting link between the muscular conduits and the nervous control.

It is interesting that just as Gaskell and Wooldridge drew attention to the physiology of an atrio-ventricular connection before its anatomic description, so this important discovery of Keith's is antedated by Hoffmann's[8] demonstration of the rhythmicity of contraction of the large veins and his suggestion that they are the probable seat of origin for the heart's action. Still others[9] have maintained that the venous sinus is the only area which influences the action of the whole heart.

If we add to these epoch-making advances the interesting results obtained by Loeb on ionic influences and the remarkable work of Howell and Duke[10] in showing the coincidence of vagus impulses and the liberation of potassium in the heart wall we begin to realize what a revolution our knowledge of the hitherto inexplicable phenomenon of the heart beat is undergoing, and what a new cardiac pathology is becoming conceivable, especially for the interpretation of the cardiac arrhythmias. The results thus far arrived at will stimulate further study. That the last word concerning the myogenic and neurogenic theories has not yet been said is to be seen from the work of Carlson[11] on the heart of certain lower forms; his studies lend important confirmation to the neurogenic doctrine. He finds that the heart of the limulus or king crab, when separated from the nervous ganglia, ceases to beat. He also finds in later work[12] that the automatic action of the limulus heart begins before there is any evidence of nerves supplying it.

THE CLINICAL ASSISTANT IN GENERAL PRACTICE

The loss of the personal element, as exemplified particularly in the system of preceptorship, on which we commented recently,[1] has been deplored as an unfortunate necessity in the changing methods of medical education. While there is a conscious effort on the part of the better schools to obviate this defect by subdivision of the classes, thus bringing about as far as possible an intimate association between teacher and pupil, a new institution which promises to be of even greater value, seems to be evolving from the very cause that brought about the collapse of the older system. The enormous broadening of the field of knowledge and activity which faces the conscientious physician of to-day is making it more and more difficult for one man unaided to do justice to a large number of patients, and thus an increasing number are finding it necessary to employ an assistant. This postcollegiate association of a younger with an older man is in a way taking the place of the older custom. At present this practice is restricted largely to the more progressive and better established physicians, but it could undoubtedly be much more widely utilized with advantage both to the younger man and to the older practitioners, as well as to the public. In his farewell address to the medical students of this country and Canada, Dr. Osler said:

"I wish the custom of taking junior men as partners and assistants would grow on this continent. It has become a necessity; and no man in large general practice can do his work efficiently without skilled help. How incalculably better for the seniors, how beneficial to the patients, how helpful in every way if each one

1. His, W., Jr.: Arb. a. d. med. Klin. zu Leipzig, 1893, p. 14.
2. Retzger: Arch. f. u. Entwcklngsgesch., Anat. Abth., 1904, p. 1.
3. Gaskell: Jour. Physiol., 1883, iv, 43.
4. Wooldridge: Arch. f. Physiol., 1883, p. 552.
5. His, W., Jr.: Centralbl. f. Physiol., 1895, ix, 469.
6. Erlanger, J.: Jour. Exper. Med., 1906; Centralbl. f. Physiol., 1905, xix, 4; Am. Jour. Physiol., 1906, xv, 153.
7. Gibson, G. A.: Johns Hopkins Hosp. Bull., 1908, xix.
8. Hoffmann, A.: Med. Klinik, Berl., 1906, ii, 1113.
9. McWilliams: Jour. Physiol., 1888, ix, 167. Adam: Arch. f. d. ges Physiol. (Pflüger's), 1906, cxi, 607.
10. Howell, W. H., and Duke: Johns Hopkins Hosp. Bull., 1908, xix, 51.
11. Carlson, A. J.: Am. Jour. Physiol., 1905-6, xx, 99-120. See also critical review by Vaquez, H.: Arch. d. mal. d. coeur., Paris, 1908, i, 574-581.
12. Am. Jour. Physiol., February, 1908, xxi, 1.

1. Dec. 12, 1908, li, 2063.

of you, for the first five or ten years, was associated with an older practitioner, doing his night work, his laboratory work, his chores of all sorts!"

The advantage to a busy physician of the services of a younger man to do this sort of work for him is equaled only by the value of such an experience to the assistant. Undoubtedly, each man would do better work under the eye of the other, and the breadth of view afforded by the comparison of ideas and experience, and by the leisure to digest and systematize the never-ending clinical observations, etc., would be found to add materially to the pleasure of the work and to the efficiency of the workers. Each patient would probably receive more thorough consideration. That the public is quick to appreciate thoroughness need hardly be said; and while there are many patients who can not afford to pay adequately for the time and labor involved, if they are accepted as patients, surely anything less than thoroughness is unfair—and poor "business" beside.

There are hosts of young men capable of filling the position of assistant who would be glad of a chance to do such work, especially those who have not obtained a hospital position after graduation. On the other hand, there are undoubtedly many older physicians who would find great relief in help of this kind, did they but realize it. Force of circumstances is bringing about an ever-widening realization of the necessity of such cooperation.

A "FASTING CURE" FOR SYPHILIS

A journal called *Eternal Progress*, devoted apparently to the advancement of the mental healing cult, gives in its May issue a remarkably striking instance of the snake that lies hidden in the rank herbage of quackery. A correspondent asks the following question: "Some years ago I contracted syphilis and, as I am about to marry, I would like to find a remedy. Would dieting for thirty days produce a cure?" It seems incredible that any sane person, having intelligence to write decent English, should be capable of delivering himself of such a terrible doctrine as is contained in the following answer: "The best remedy for any venereal or blood disease is fasting. A fourteen-day fast will cure most cases. Mild cases could be cured in a fast of eight or ten days,"—and much more, extolling the virtues of fasting as a cure-all. While we do not, of course, ascribe to the writer of the answer any criminal intent, there is a degree of culpable ignorance which amounts to criminality, and that point is surely passed in this pernicious advice. It is appalling to think of the children that may be born with envenomed constitutions should the inquirer act on such deadly advice. The indifference of ignorance is hard enough to combat; but what shall we say of this cruel betrayal of one who, conscious of his condition, has conscience enough to desire to prevent the transmission of his taint to his innocent wife and offspring? For the assertion is absolutely false in each of its three clauses.

PELLAGRA

In a late issue of the *New Orleans Medical and Surgical Journal* Dr. George H. Searcy[1] states that since he reported on pellagra to the Alabama State Medical Association last year he has visited nearly all the southern states and many of the southern state insane hospitals and is convinced that pellagra prevails in all parts of the south. Physicians tell him that it has only been within the last decade that they have observed any such disease, and he himself believes that it must be on the increase. So far as we are aware there have been no reports of it as yet from any of the northern states, even those where maize is extensively cultivated and used for food and where it might be looked for with as much *a priori* probability of finding it as farther south. There is opportunity here for interesting medical research which we feel sure will be utilized by individual physicians and by the state authorities as well as by the U. S. Public Health and Marine-Hospital Service. Pellagra and hookworm disease are evidently of more economic importance than was at first thought probable.

Medical News

ALABAMA

Health Week in Tuskegee.—Health Week was held in Tuskegee during the week beginning December 13. During the week the traveling exhibit of the National Association for the Study and Prevention of Tuberculosis was open, and a program of illustrated addresses and platform meetings and conferences was held under the direction of the advisory board, which included representative colored men and women from all parts of the county.

Personal.—Drs. John Douglass and J. Frank Hogan, Birmingham, have been elected members of the board of control of Hillman Hospital.——Dr. Edward K. Moon, city physician of Anniston, has resigned.——Dr. Douglas G. Campbell, Mobile, has been elected physician of Mobile County.——Dr. Harry T. Day, Montgomery, has been elected physician of Montgomery County.——Dr. V. H. Williams, Calera, has been elected health officer of Shelby County.

Society Meetings.—At the annual meeting of Mobile County Medical Society, held in Mobile, December 17, Dr. Percy J. Howard was elected president; Dr. William R. Jackson, vice-president; Dr. Stephen F. Hale, secretary; Dr. Seale Harris, treasurer; Dr. Charles A. Mohr, librarian; and Dr. Douglas G. Campbell, censor, all of Mobile.——Montgomery County Medical Society, at its annual meeting, held in Montgomery, December 12, elected Dr. James N. Baker, president; Dr. Wilbur A. Sellers, vice-president; Dr. Paul S. Mertins, secretary-treasurer; and Dr. Forney C. Stevenson, censor, all of Montgomery.

CALIFORNIA

Tag Day in San Francisco.—Receipts from "Tag Day" in San Francisco netted $28,101.52 to the fund for the Childrens' Hospital.

Personal.—Dr. Clarence S. Six, Stockton, has been elected health officer of San Joaquin county, vice Dr. J. Porterfield Hull, term expired.——Dr. George K. Herzog, San Francisco, will soon leave for study in Germany.

Want Anti-plague Work to Continue.—At a conference held December 10, in San Francisco, it was agreed that a formal request should be made to the Surgeon General of the P. H. and M.-H. Service, to continue for an indefinite period the supervision of the sanitary work in the bay section, the request being signed by the governor, the members of the State Board of Health, the mayor, the local board of health of San Francisco, and the hospital and health committee of the board of supervisors.

Elections.—At the annual meeting of the Southern California Medical Society, held in Santa Ana, December 2 and

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3, the following officers were elected: President, Dr. Fred R. Burnham, San Diego; vice-presidents, Drs. Charles D. Ball, Santa Ana, and Joseph M. Holden, Long Beach, and secretary-treasurer, Dr. Joseph M. King, Los Angeles.—At the annual meeting of the Southern California Public Health Association, held in Santa Ana, December 1, Dr. Charles D. Ball, Santa Ana, was elected president; Dr. W. Harriman Jones, Long Beach, vice-president, and Dr. William W. Roblee, Riverside, secretary-treasurer.——At the annual meeting of Yolo County Society for Medical Improvement, held November 24, Dr. Thomas W. Gallion, Davisville, was reelected president; and Dr. Frances L. Newton, Woodland, secretary.——Butte County Medical Society, at its annual meeting, held in Chico, December 8, elected the following officers: President, Dr. Newton T. Enloe, Chico; vice-president, Dr. Lewis L. Thompson, Gridley; secretary-treasurer, Dr. Ella F. Gatchell, Chico; censors, Drs. Lewis O. Thompson, Gridley, and Perry F. Bullinger, Chico, and delegate to the state society, Dr. Dan H. Moulton, Chico.——At the annual meeting of San Bernardino County Medical Society, held in Redlands, December 9, the following officers were elected: Dr. William P. Burke, Highland, president; Drs. Hoell Tyler, and Thomas M. Blythe, Redlands, vice-presidents; Dr. Gayle G. Moseley, Redlands, secretary; Dr. William A. Taltavall, Redlands, treasurer, and Dr. D. Charles Strong, San Bernardino, delegate to the state society.

COLORADO

Postgraduate Club.—The Postgraduate Club of Denver and Gross Medical School has instituted a course of study as outlined by the American Medical Association.

Advises Against Skyscrapers.—The Denver County Medical Society has advised the city council against the erection of buildings more than eight stories in height on the ground that it would be especially insanitary to exclude more air and sunlight from the streets of a city which has so large a population of tuberculous persons.

Personal.—Dr. Edward C. Hill has been appointed chemist in charge of the state station of the United States Department of Agriculture recently opened in Denver.——Dr. Isaac B. Perkins has been elected a director and Dr. Eleanor M. Lawney, examiner of the Denver Hospital Saturday and Sunday Association. The association netted $4,600 as a result of its tag-day collection in November.

State Board Needs.—The secretary of the State Board of Health, in his biennial report, asks an appropriation of $50,000 for the next two years; the appointment of two sanitary inspectors to deliver lectures over the state on the prevention of disease; the establishment of a laboratory of hygiene in the capitol building, the appointment of two more food inspectors, an extra clerk, and the enactment by the next legislature of a law compelling physicians to report cases of tuberculosis to the board.

DISTRICT OF COLUMBIA

Personal.—Dr. J. J. Kinyoun has been appointed pathologist and Dr. Truman Abbe, radiologist on the staff of the Tuberculosis Hospital.——Dr. J. Ford Thompson has returned from abroad.

Abortionist Goes to Prison.—Edward Leon Thompson, known as "Dr. Leon," said to have been convicted recently of performing a criminal operation, was taken to the Federal prison at Atlanta, Ga., December 2, to serve out his sentence.

Antituberculosis Association Organized.—The Association for the Prevention of Tuberculosis in the District of Columbia was incorporated November 6, ex-Surgeon General George M. Sternberg, U. S. Army, being elected temporary president, and Brigadier General William H. Forwood, U. S. Army, retired, treasurer.

To Prevent Food Adulteration.—The legal officers of the Department of Agriculture have decided that the department has the right to punish hotel, restaurant and boarding-house keepers who supply adulterated food to consumers. The matter is to be taken up by the health department and measures will be instituted for the prosecution of the violators of the law. The crusade against insanitary restaurants has resulted in the arrest of 117 proprietors, all of whom have been fined or put under bonds.

ILLINOIS

Bids for Building Rejected.—All of the proposals for the erection of the new Cook County Infirmary buildings at Oak Forest were rejected December 11 by the special committee. The amount at the disposal of the members for the erection of the new infirmary buildings and the tuberculosis hospital on the county hospital grounds is $2,000,000, while the lowest bid received for the construction of the infirmary alone was $1,898,358.

State Institutions Under Quarantine.—The Illinois State School for the Deaf, Jacksonville, was put under quarantine by the city and state health authorities December 15, on account of an epidemic of scarlet fever, of which 110 cases are said to exist.——Quarantine has been established at the Illinois Eastern Hospital for the Insane, Hospital, as a result of the discovery of five cases of diphtheria in the institution, three among patients and two among nurses.

Personal.—Dr. James W. Pettit, president of the State Medical Society, addressed St. Clair County Medical Society at East St. Louis, December 10, on "Medical Organization."——Drs. James W. Pettit, Ottawa, and James A. Egan, Springfield, have been appointed by the governor as members of the States Commission to Investigate Occupational Diseases.——At the annual meeting of the Canton Physicians' Club, December 14, an ebony gold-headed cane was presented to Dr. James E. Sutton, the oldest practitioner of Canton, the presentation speech being made by the president of the club, Dr. W. E. Shallenberger.

Chicago

Communicable Diseases.—During the week ended December 26, 644 cases of communicable diseases were reported to the health department, or 100 less than for the preceding week.

Personal.—Dr. Archibald Church has resigned as editor of the *Chicago Medical Recorder*.——Dr. Juliet N. Stevens has returned from a trip to England and Scotland.——Dr. Anthony Biankini has had conferred on him by the Emperor of Austria the order of the Iron Crown, third class.——Dr. William A. Fisher, who has been very ill at his home, is reported to be convalescent.——Drs. Ludwig Hektoen, George W. Webster, and Alice Hamilton have been appointed members of the State Commission to Investigate Occupational Diseases.

Chicago's Health.—The death rate for the week ended December 26, reached the phenomenally low rate of 11.59 per 1,000 per annum. There were 98 fewer deaths than in the preceding week and 87 fewer than in the corresponding week of last year. As compared with last year, there were 34 fewer deaths from pneumonia, 18 fewer from nervous diseases, 12 fewer from bronchitis, 9 fewer from diphtheria, 5 fewer from nephritis, 4 fewer from influenza, 3 fewer from typhoid and whooping cough, and 2 fewer from scarlet fever. Among the chief death causes were pneumonia, 69; tuberculosis, 48; heart diseases, 40; violence (including suicide), 37; acute intestinal diseases, 33; nephritis, 31; and cancer, 29. Diphtheria and scarlet fever each caused 14 deaths; typhoid fever, 4; measles, 3, and whooping cough and influenza, each 2.

INDIANA

Personal.—Dr. William R. Davidson has associated himself with Drs. Edwin Walker and James Y. Welborn in the management of the Evansville Sanitarium.——Dr. William A. Justice, Greenfield, has been appointed physician of Hancock County.——Dr. Francis M. Ihrig, Goshen, has been re-elected secretary of the board of health of Elkhart County.——Dr. James E. King, Richmond, has been re-elected secretary of the Wayne County Board of Health.——Dr. Oliver M. Davis, Marion, has been appointed health officer of Grant County.——Dr. Charles B. Kern, Lafayette, has been reappointed physician of Tippecanoe County.——Dr. Alexander G. Schlieker, East Chicago, has been appointed district surgeon for the C. L. S. & S. B. Railroad.——Dr. Marion Glenn, Vincennes, secretary of the Knox County Board of Health, has resigned.

NEBRASKA

Higher Requirements at State University.—The entrance requirements to the College of Medicine of the State University have been increased to two years of work in the liberal arts college or its equivalent.

Board Sustained.—In the case of J. T. Mathews, Omaha, charged with having performed an illegal operation, whose license to practice medicine was revoked by the State Board of Health, and who appealed to the supreme court, decision has been given in favor of the board and the revocation of Mathew's certificate has thus been made permanent. This is a notable victory for the medical profession as the decision will form a precedent from which appeal is not likely to be taken.

NEW YORK

Personal.—Dr. Pierce J. Candee, Buffalo, was painfully injured recently by a collision between his automobile and an electric car.——Dr. John G. Curtis, professor of physiology in the College of Physicians and Surgeons, New York City, since 1875, and Dr. T. Mitchell Prudden, professor of pathology since 1891, will retire June 20.

Smoke Nuisances.—Commissioner Eugene H. Porter of the State Health Department, after investigation, has reported to the governor that certain manufacturing plants near Bayonne, N. J., are a public nuisance, and that the smoke and fumes emitted from them are detrimental to health, destroy vegetation and retard the recovery of hospital patients in many parts of Staten Island.

Foot-and-Mouth Disease.—The Commissioner of the State Department of Agriculture states that, so far as known, every animal afflicted with foot-and-mouth disease has been killed and buried. The disease has existed in 49 localities in 5 counties of the state. The efforts of the department are now being directed to a thorough disinfection of all places where the disease is known to have existed.

Report of Tuberculosis Hospital.—The State Hospital for the Treatment of Incipient Tuberculosis, Raybrook, reports that 477 patients have been treated in the institution during the year. There are in the hospital at present 163 patients, of whom 80 are males. The cost to the state is $9.47 a week per capita. During the year only three patients died in the institution, and 301 were discharged, most of whom had been benefited and many of whom had been cured by the treatment.

Regulations Governing the Practice of Optometry.—The New York State Board of Examiners in Optometry has made public the rules which became effective January 1 governing the practice of optometry. No one may examine eyes for glasses without a certificate from this board. An investigation is now in progress to determine the qualifications of a large number of those who have applied for certificates. Dispensing opticians, who merely fill prescriptions for glasses, and storekeepers who sell glasses to customers on the latter's selection are not required to have certificates.

Dr. Trudeau Honored.—A dinner was given at one of the hotels in Saranac Lake, December 19, at which fifteen men were present, and at which Dr. Baldwin presented Dr. Trudeau with two volumes of reprints on the "Studies in Tuberculosis" by his pupils in commemoration of his sixtieth birthday, Oct. 5, 1908, sumptuously bound in crushed red levant decorated with the head of Æsculapius, pine trees and fleur de lys. Dr. Walter V. James, New York City, presented Dr. Trudeau with a number of letters from personal friends congratulating him on the occasion of his sixtieth birthday. This celebration had been postponed on account of the Congress on Tuberculosis, and for other causes.

New York City.

Want More Experienced Ambulance Surgeons.—Coroner Harburg has prepared a bill for introduction in the next legislature prohibiting a hospital interne with less than six months' experience from acting as ambulance surgeon. Coroner Harburg believes the passage of such a bill will lessen the number of mistaken diagnoses and the number of deaths.

Poison in Christmas Candy.—The owner of a candy store on the upper East Side on December 20, was convicted of selling impure candy. The inspector of the health department who appeared against the defendant said that he had bought some of the candy and that an analysis showed that it contained sulphurous acid and coal tar dye. The dealer was fined $25.

Herter Lectures.—Dr. J. B. Leathes of the Lister Institute, London, will deliver the six Herter Lectures on the subject of "The Metabolism of the Non-Nitrogenous Substances in the Animal Body" in the Carnegie Laboratory of the University and Bellevue Hospital Medical College, beginning January 4, at 4 p. m., and continue daily throughout the week. Those who are interested are invited to be present at the lectures.

New Beth Israel Hospital Planned.—The board of directors of the Beth Israel Hospital has directed the building committee to select a block on the East Side between Houston and Twenty-third streets as a site for new hospital buildings. The hospital association has real estate worth $50,000 and a building fund of $100,000 with promises of generous subscriptions for a large new institution, as the present one is entirely inadequate.

Cause of Cancer.—The investigation of the cause of cancer and its possible prevention and cure has been begun in the College of Physicians and Surgeons under the direction of a committee composed of Drs. Samuel W. Lambert, dean, William J. Gies, professor of physiologic chemistry; Dr. Philip H. Hiss, Jr., professor of bacteriology; Francis C. Wood, professor of clinical pathology; Gary N. Calkins, professor of protozoology, and Eugene H. Pool, instructor in surgery.

Sanitary School for Columbia.—Twelve experts in hygiene and sanitary science are at work on a plan for the establishment of a school of preventive medicine in connection with Columbia University. It is proposed to train men for the positions as health officers and sanitary inspectors, so that even small towns may be properly safeguarded against conditions that foster and breed disease. The medical members of the committee appointed by President Butler are Drs. Norman E. Ditman, Samuel W. Lambert, Philip H. Hiss and M. Allen Starr. The proposed school will seek to prevent tuberculosis, blindness and alcoholism. A careful study of meat and foodstuffs, dairies and the milk supply will be features of the course.

Brooklyn's War on Tuberculosis.—The Brooklyn Committee for the Prevention of Tuberculosis has been receiving applications from all parts of the country for literature, and, while physicians have been generous in their offers of free lectures, the demand has been so great that applications are refused almost daily. The committee is now furnishing more than one hundred diets and assigns a visiting nurse to patients who are confined to bed. There are 6,000 cases of tuberculosis registered in the borough and one dispensary, St. Peter's Hospital and the home for consumptives at Kingston avenue and St. John's place, are the only institutions where destitute consumptives are admitted. The committee has secured the right to use the backs of transfers in its campaign of education. The work of the committee is supported entirely by voluntary contribution.

Charity Organization Society Work.—The twenty-sixth annual report of the Charity Organization Society of New York City has just been made public. The report shows that the total number of cases in charge of the Districts and Investigation Bureau as 6,716 for the year 1906-1907, and 8,621 for the year 1907-1908, an increase of 28 per cent. Owing to the financial depression, the work of the society was very much increased in all departments, excepting that there were fewer consumptives requiring care in their homes; this was due to greater intelligence in regard to the disease and more accommodations in institutions for consumptives. The society disbursed more than $200,000 during the year and is only about $10,000 in arrears. In addition to the educational work of the society in regard to tuberculosis, it is working for further amendment of the tenement-house law, reforms in the children's courts and in criminal courts.

The Tuberculosis Exhibit.—On December 26, Italian Day, at the Tuberculosis Exhibit, Dr. Antonio Stella presided and there were addresses by Count Reybaudi Massiglia, Consul General of Italy, Hon. Prospero de Nobili, member of the Italian Parliament, and a number of other prominent Italians. On January 2 there is a mass meeting of street railway employés and on the following day a general meeting will be held under the auspices of the Committee on Congestion of Population. Nathan Straus in his address at the Tuberculosis Exhibit urged the enactment of a law against bringing other tuberculous cattle into the state. He said that, according to the reports of Prof. Veranus A. Moore, an exhaustive study of the records of actual tests of 626 dairy herds in the state showed that 386 herds, or 61.7 per cent., were infected with tuberculosis. He also thought we ought to have a law preventing the so-called "commercially pasteurized" milk from masquerading as pasteurized milk, for it was not thoroughly pasteurized, but merely warmed sufficiently to prevent souring.

Testing New Medical Law.—Under the new medical law, passed in 1907 and the first one instituted by the County Medical Society in the 102 years of its existence, six practitioners were put on trial on December 9 charged with various felonies and misdemeanors. Proceedings were brought by the society for the revocation of the licenses of these men. The physicians on trial in these disbarment proceedings are Dr. Moses Jackson, ex-coroner, said to have been found guilty of bribery; Drs. Edward E. Conrad and Francis Gray Blinn, both of whom were sentenced to from one to two years in State prison for attempted abortion; Dr. Frank J. Dudenhausen, found guilty of practising under an assumed name; Dr.

Robert Ormsby who had been fined for selling drugs for criminal purposes, and Dr. Rudolf Mielke who had been convicted of sending indecent literature through the mails. The committee will probably not make its findings known until next March. The accused may have their license revoked, their registrations annulled or may be suspended from practice. If their licenses should be revoked they may apply for renewal after a year. The society has other applications for revocation of licenses in preparation.

NORTH CAROLINA

Personal.—Dr. Paul P. Lane, Wilson, has been appointed resident physician at the James Walker Memorial Hospital, Wilmington.——Dr. Baxter S. Moore, Charlotte, who was operated on for appendicitis at St. Peter's Hospital, Charlotte, December 7, is doing well.——Dr. William H. Whitehead, Rocky Mount, formerly a member of the State Board of Health and State Board of Medical Examiners, has been obliged to retire from practice on account of ill health.——Dr. Samuel D. Booth, Oxford, is reported to be seriously ill at his home.

Decision Reversed on Appeal.—In the case of Dr. S. Westray Battle, Asheville, a member of the State Board of Health, cited to appear in the police court of Asheville to tell "what he knew about the illegal sale of liquor in the city of Asheville," and who, when he responded to the summons of the court, demanded the name of person or persons responsible for the summons, which information was refused him, whereupon Dr. Battle declined to be sworn, and was fined $25, the higher court has decided in favor of Dr. Battle. In his decision, the judge of the higher court stated, "the courts of this state will not allow any back-door or gumshoe methods."

LOUISIANA

Election.—At the annual meeting of Shreveport Medical Association, held December 2, Dr. I. M. Galloway was elected president; Dr. Joseph J. Frater, Shreveport, vice-president; Dr. Arthur A. Herold, Shreveport, secretary; and Dr. John A. Hendrick, Eastpoint, treasurer.

Physician Fined.—In the case of Dr. L. J. Breaux, Lafayette, charged with prescribing whisky and other intoxicating liquors on Sunday in violation of law, the defendant is said to have been found guilty and sentenced to pay a fine of $100 and to be imprisoned for thirty days. He immediately gave notice of appeal.

Memorial Dedicated.—The Delgado Memorial Building of the Charity Hospital, New Orleans, was formally dedicated December 19. Dr. Ernest S. Lewis presided over the ceremonies, and in his address reviewed the history of Charity Hospital with special reference to the munificence of Isaac Delgado and his deceased wife. Mayor Behrman paid an eloquent tribute to the munificence of Mr. Delgado. Dr. L. G. LeBeuf in his address, referred to the eminence of Dr. Lewis and Dr. Matas, and spoke with pride of the record of Charity Hospital. Dr. Rudolph Matas then read a eulogy on the life of Mr. and Mrs. Delgado, after which he delivered a brilliant address in which he commented on the blessings conferred on humanity in the legacy of the rich. He bore a message of thanks from Mr. Delgado to Charity Hospital, the corporation, and the members of the building committee for their untiring work and zeal, to the sisters, nurses, and attachés, for their interest in the institution, and to the architects for their courtesy. Dr. Matas further said that the man who gives as Mr. Delgado had given was both a statesman and philanthropist, and his deeds would live ages after his death, as a benefaction to mankind. The new building has cost approximately $200,000, is five stories in height, strictly fireproof, modern in equipment, and is to be devoted to surgical and gynecological cases.

PENNSYLVANIA

Philadelphia

Clinic Purchases Property.—The Philadelphia Clinic for Home Treatment of Chest and Throat Diseases has recently purchased the property 2114 Lombard street and has made application to the State Board of Charities for an appropriation to adapt the building for the clinic's work. Until these alterations are completed the clinics will continue to be held at 519 South Fifteenth street, Mondays, Wednesdays and Fridays, at 3 p. m. Dr. Frank Read is president of the board of trustees and Dr. Thomas J. Mays, medical director.

Health Report.—The total number of deaths reported to the Health Bureau for the week ended December 26, was 474, a decrease of 10 from the previous week and a decrease of 127 from the corresponding week of last year. The principal causes of death were: Typhoid fever, 3; scarlet fever, 2; pertussis, 3; diphtheria, 13; consumption, 45; cancer, 21; apoplexy, 17; heart disease, 48; arteriosclerosis, 13; acute respiratory diseases, 94; enteritis, 13; nephritis, 48; congenital debility, 7; premature birth, 9; senility, 6; suicide, 2; accidents, 19. There were 164 cases of contagious disease reported, with 18 deaths, as compared with 208 cases and 24 deaths reported in the preceding week.

GENERAL NEWS AND COMMENT

Honors to Finlay.—The French government has conferred the decoration of the Legion of Honor on Carlos J. Finlay of Havana, Cuba, in token of appreciation for his discoveries in regard to the transmission of infection by mosquitoes. The presentation of the decoration was celebrated, at the same time as his seventy-fifth birthday, at a special meeting of local and national notables in the assembly hall of the Academy of Sciences, Havana. At the same time a decree of the provisional governor was read setting forth the importance to the Cuban people of the professional services of Dr. Finlay, especially in connection with the discovery of the means of transmitting yellow fever. This decree provides for the retirement of Dr. Finlay at his own request and because of his advanced age, from the position of chief sanitary officer, and for his appointment as honorary president of the National Board of Sanitation and Charities, which office is created for his life time and will terminate with his death. The salary of this position is to be $2,500 per year. The decree also provides for the publication by the government of a volume of selections from the writings of Dr. Finlay, not to exceed 500 pages nor 1,000 copies.

FOREIGN

Cajal Elected to the Spanish Senate.—Ramon y Cajal has been elected a senator to fill the vacancy left by the death of San Martin.

War Against Tuberculosis in Spain.—The Spanish government is transforming three old lazarettos into asylums for tuberculous children of the poor. Their location renders them peculiarly well adapted for sanatoria.

The Polyclinic in Buenos Aires.—The *Semana Medica*, November 19, contains an illustration of the souvenir plaque and parchment with numerous autographs presented to Dr. E. Canton, dean of the faculty of medicine, when his efforts to found the polyclinic were crowned with success by an official decree establishing it and appropriating funds for its maintenance.

Retirement of Haeckel.—Prof. E. Haeckel retires this year from the chair of zoology at Jena in order to devote his entire time to completing the Phylogenetic Museum there which he founded and presented to the university at the recent celebration of its 350th anniversary. He has been professor of zoology at Jena since 1865, and is now 74. After a brief experience as general practitioner at Berlin, he turned his attention entirely to the natural sciences. Less than ten years ago he published an extensive work, "World Problems," reviewing the results of a lifetime of research and presenting his views on the problems of the universe.

Italian Congress for History of Medicine.—An Italian society to foster the study of the history of medicine and other sciences was organized last year, and it held its first congress at Faenza in October. A number of interesting data recently learned in regard to the physicians and anatomists of the fifteenth, sixteenth and seventeenth centuries were announced, among them being the discovery of the tomb of B. Eustachio, of Eustachian tube fame. The tomb is in the Church of the Twelve Apostles at Rome, and has hitherto been ascribed to the Buonarotti family and has been pointed out to visitors as the tomb of Michelangelo. A work by Morgagni was presented which showed his knowledge of valvular disease of the heart, also MS by Malpighi, and the report of the first case of syphilis—Morbus gallicus—observed in Italy, transcribed in a diary of the year 1400, with comments on the arrival of the French army under Charles VIII and its accompanying 1700 prostitutes. In these centuries Italy was distinguished by the absence of restrictions on postmortem work. The congress will meet at Venice in 1909 and at Rome the following year. The latter city has the only chair in Italy for study of the history of medicine.

Prizes Distributed by French Academy of Medicine.—As usual, a number of cash prizes were distributed at the annual meeting of the Paris Academy in December. This year forty-one prizes, amounting to about $14,000, were distributed, all but

five going to French physicians. These exceptions were a prize of $200 to F. W. Pavy of London for his research on diabetes; $160 to Vladoff of Bulgaria for his work "Homicide in Mental Pathology"; $160 to Remlinger of Constantinople for his research on rabies, and a smaller prize to Lesage of Buenos Aires for experimental research on maté (Paraguay tea), and to Ioteyko of Brussels. No works were received in competition for four of the prizes, representing a total of over $1,000. The subjects thus ignored were: "Treatment of Mental Affections"; "Detachment of the Placenta During the Last Two Months of Pregnancy or in Labor"; "Melancholia," and "Diphtheria." Three prizes were not awarded, as no worthy articles had been presented on the "Relation Between Infectious Diseases and Neoplasms," on "Medical Statistics" and on "Hernia or Asthma." Again, the great Audiffred prize was offered for a sovereign remedy for prevention or cure of tuberculosis; this would insure an annual income of $4,800. Also the Guzman prize for effectual treatment of organic heart disease; this insures an income of $260. Needless to say these prizes are still open to competition. The prize for the best work on "Circulation of the Blood" was given to Parisot for his experimental research on "Arterial Pressure and the Ductless Glands." The surgery prize of $1,000 was awarded to Monprofit for his achievements in surgery of the stomach. The prize in obstetrics was given to Couvelaire for his work on "Hemorrhage in the Medulla and Cord Following Application of Forceps." THE JOURNAL referred to the principal prizes offered, open to international competition, in the issue for Jan. 14, 1905, p. 138, and our French exchanges of the latter part of December always contain the full details for the following two years.

LONDON LETTER

(From Our Regular Correspondent)

LONDON, Dec. 15, 1908.

Serious Condition of the London Milk Supply

The London County Council recently appointed a veterinary inspector for the purpose of inspecting the cows and farms outside London which supply milk to the metropolis. His first report is very serious. Samples of milk were taken at the various railways, and the examination of 92 of the 204 taken has been completed at the Lister Institute, with the result that 22 have been found tuberculous.

Expedition of the Liverpool School of Tropical Medicine to Jamaica

The twenty-first expedition of the Liverpool School of Tropical Medicine has left Bristol for Jamaica. It consists of Mr. R. Newstead and Dr. W. T. Prout, late principal medical officer of Sierra Leone. The expedition will be later joined by Dr. A. H. Hanley, late principal medical officer of Southern Nigeria. The objects of the expedition are both medical and entomologic. Dr. Prout and Dr. Hanley will investigate: 1, The prevalence of malaria in Jamaica; 2, the prevalence of filaria in Jamaica; 3, measure for the prevention of mosquito-borne diseases; 4, the so-called "vomiting sickness" of children. Mr. Newstead will investigate: 1, The bionomics of ticks and advise methods of control; 2, the scale insects which are threatening the citrus and coconut cultivation; 3, make a study of the biting insects and ticks of the island for the use of students of the Liverpool School of Tropical Medicine.

Health of the Navy

A very satisfactory report on the health of the navy in 1907 has just been issued. The total force dealt with amounts to 108,740 men, and the total number of cases of disease and injury was 75,351, which is in the ratio of 69.2 per cent., a decrease on 8.5 on the average of the last five years. The average loss of service per man from sickness was 10.46 days, a decrease of 1.29 on the average of the last five years. The decrease in the cases of Malta fever is remarkable and bears striking testimony to the decline of the disease since goat's milk was discovered to be the source of infection. The case ratio has fallen from an average of 3.47 in the last five years to 0.26. Yellow fever appeared in the fleet for the first time since 1904. Seven cases are reported from North America and the West Indies, of which three proved fatal. Malaria fever is on the decline; the case ratio has fallen from 0.67 per cent. to 0.341. This is partly due to the withdrawal of ships from malarial districts and partly to the use of mosquito curtains and quinin as a prophylactic. Nineteen deaths from suicide are reported—a slight increase on the average.

The Doctor and the Light Cure Institute

The difficulty of a doctor working in a professional manner in a commercial institution in the treatment of disease is shown by the case of Dr. A. E. Neale, who sued the Baritsu Light Cure institute for breach of agreement. In entering into the service of the institute every precaution was taken that his work should be carried on strictly ethical lines. His agreement was submitted to the British Medical Association which inserted certain stipulations. As medical superintendent of the institute the doctor was to have entire control of the treatment, he was to be responsible for the admission of patients and no advertisements were to be issued without his knowledge. In spite of this, during his absence on a holiday advertisements of the usual character undertaking to cure sciatica, lumbago, sprains, gout, rheumatism, neuralgia, eczema, falling of hair, etc., backed by testimonials were scattered broadcast. Evidence was given by Dr. Bateman, general secretary of the Medical Defence Union, that the advertisements were of such a character that if they had been issued with the physician's knowledge it would have led to his appearance before the general medical council, with the probability of the removal of his name from the register. Responsibility for their issue was admitted by Mr. Barton-Wright, managing director of the institute. He also admitted that his remuneration depended on the dividends earned and that finding the receipts falling off he had issued the pamphlet at his own expense. The defendants counterclaimed for alleged negligence and incompetence of the physician in the treatment of patients. The jury gave a verdict in Dr. Neale's favor, with $3,000 damages.

The Central Medical Council and Unqualified Practice

The freedom with which irregular practitioners of all sorts —quacks and nostrum vendors—are permitted to defraud the public has long constituted a scandal. As stated in previous letters, there are some signs that our authorities are waking up and will place some check on these frauds. In his presidential address to the General Medical Council (the body in Great Britain which is appointed by the government to regulate medical education and to exercise disciplinary powers over the profession), Sir Donald MacAllister reported that by means of the friendly assistance of the foreign and colonial offices the council had obtained a large mass of authoritative information respecting the laws regulating the practice of medicine and the restrictions imposed on unqualified practitioners throughout the empire and in foreign countries. This information, which has reached the council in various forms and in numerous languages, has been analyzed and digested by the registrar and his staff for the use of the committee for the prevention of unqualified practice. When this has served the committee's purposes it will be published. No publication of the kind in which the laws of the civilized world on the subject of unqualified practice are surveyed has hitherto been available.

PARIS LETTER

(From Our Regular Correspondent)

PARIS, Dec. 19, 1908.

Adulteration of Foodstuffs

Out of 1,755 analyses made by the municipal laboratory during October, 1,404 samples were of good quality, while 351 were adulterated or of bad quality. The adulterated or inferior foods make up 20 per cent. of the food consumed in Paris. Out of 505 samples of milk analyzed, 83, or 16.4 per cent., were adulterated. Out of 310 wines analyzed, 47, or 15.1 per cent., were adulterated. All these analyses were made on samples selected at random; they therefore represent the average. Analyses made after seizures make a much worse showing. During October, in consequence of 105 police seizures, 103 violations of the ordinances were declared.

Adulteration of Drugs

A few days ago it was legally decided that the law of 1905 in regard to adulteration of foodstuffs applied also to pharmacists. For having fraudulently substituted, in filling a prescription, a low-priced for a high-priced substance, a pharmacist was sentenced to a month in prison (*avec sursis*), a fine of 500 francs (about $100) and four insertions of the sentence in the papers. The decision declares that there is no reason why pharmacists should be exempted from the operation of the law on frauds. The syndicate of pharmacists, which was the civil party to the suit received 200 francs (about $40) as damages.

Another question is whether, under this law, the use of a non-toxic antiseptic or preservative substance, in quantities

too minute to be harmful, constitutes adulteration. A sausage-maker and a manufacturer of chemical products were prosecuted recently at Saint-Nazaire, the one for having sold, the other for having used, borax for the preservation of meats. The butcher admitted having used a powder which the chemist had told him was a harmless preservative. The lower court acquitted the defendants, and the appellate court of Rennes has confirmed the decision, on the ground that the law of 1905 presupposes fraudulent intent, which was lacking in this instance.

A New Surgical Review

The number of specialized periodicals is constantly increasing. Thus, besides the *Revue de chirurgie*, now about to enter on its twenty-ninth year, which was long the only review devoted to general surgery, the *Archives générales de chirurgie*, was founded two years ago under the direction of Professors Lannelongue and Le Dentu, and the monthly *Journal de chirurgie*, in April, 1908. Still more recently has appeared the *Lyon chirurgical*, under the direction of almost all the distinguished surgeons of Lyons, which will present the works of the Lyons school. The first number contains original articles by Albertin on cold tubal abscesses, by Carrel on Crile's direct transfusion of blood, and by Cotte on the technic of subserous cholecystectomy, a critical review on traumatisms of the wrist, a report of the proceedings of the International Congress at Brussels, and numerous abstracts.

Personal News

Dr. Quénu, professor of operative medicine in the Paris Medical School, has been chosen, at his own request, professor of clinical surgery in the same school. Dr. Letulle, *agrégé* in the Paris Medical School and physician at the Boucicaut Hospital, has been elected a member of the Academy of Medicine to fill the place of Professor Cornil, who died last April.

Industrial Accident or Disease?

The distinction between industrial accidents and occupational disease is often very delicate. Our jurisprudence tends to enlarge the idea of industrial accidents, as is shown by a recent decision in the case of a workman in a factory of chemical products, who had to clean a large retort in which were caustic residues. From the beginning of his task, the workman felt a tingling in his throat and his eyes, which continued to grow worse, until at the end of several hours, he had swollen eyes and was experiencing severe pain. Was this an accident or a disease? The court decided that it was an accident, since accidents should include, not only falls and shocks and other injuries which are produced in a single instant, but lesions resulting from a cause operating over a considerable period of time. Thus the law in regard to industrial accidents is extended to apply to workmen who have their hands frozen in carrying ice, to those who contract a disease after a short time passed in a place which is too hot or too cold, or in the midst of poisonous gases.

BERLIN LETTER

(From Our Regular Correspondent)

BERLIN, December 2, 1908.

Suits Against Insane Asylums

We physicians have daily opportunity to learn how hard it is to remove prejudice from the minds of the people. This is an experience not only in nations of a lower grade of civilization: that the peasants in Russia beat and kill the doctors in a cholera epidemic is not so much to be wondered at in consideration of the education of the Russian people. That similar crude ideas still hold their own in Germany and repeatedly manifest themselves is shown by the publication every now and then of statements regarding the incarceration and detention in insane asylums of really mentally sound individuals. A short time ago an affair of this kind came to trial in a city of Silesia. The editor of a Berlin paper rather addicted to printing sensational news, published a severe attack on the physicians in a Silesian asylum because they had received and for some weeks detained in their institution an alleged sane man, victim of a conspiracy. As usual, the trial demonstrated that the charges were completely unfounded, that the supposedly innocent victim, who naturally regarded himself as sane, was in fact insane, and that his admittance to the asylum had been quite proper. The result was that the editor was condemned to six weeks' imprisonment on account of slander. This penalty must be regarded as well deserved for it is a wanton thing to shake the confidence of the public in the insane asylums on insufficient information, and try to tarnish the reputation of physicians who are practicing their profession in a scientific manner. Unfortunately it is not to be expected that the outcome of this trial will hinder the repetition of such offenses. Probably the punishment of the editor will make his colleagues more cautious for a time, but sooner or later similar charges will appear again if any opportunity is given. And that, too, in spite of the fact that the conditions imposed by the authorities regarding the admission of insane people into public and private asylums are so strict that there is not the slightest possibility of the unjust imprisonment of patients and from time to time the asylums, both public and private, are visited by official commissions to investigate the condition of the institution itself as well as that of its patients.

Influenza in Prussia

According to the official statistics influenza carried off 5,512 persons in Prussia during 1907, twice as many as in 1906. The female sex was more affected in both years than the male. Persons over 60 years appear predominantly among the fatal cases. The largest number of deaths occur in the months from January to April and in December. The rural population furnishes a greater number of fatal cases than the cities, namely, 68 to 32 per cent., and among the occupations, the farmers show an unusually high mortality.

Suicide of School Children

The suicides of school children increasing year by year constitute an especially sad phenomenon in the hygiene of education. In the higher schools of Prussia, from 1880 to 1903, an average of fourteen pupils took their own lives annually; in 1907 the statistics show twenty, and in 1908, so far, twenty-three suicides among these pupils. Removal of the causes leading to some of these suicides among the older school children justifies the employment of school physicians even in the upper schools. So far school physicians have been officially installed only in the lower graded schools. Our neighboring community, Charlottenburg, has made a satisfactory beginning in this line by the appointment of medical inspectors for the high schools also. We may hope that this example will soon be followed by other cities.

Sanatorium and Educational Institution for Cripples in Berlin-Brandenburg

The association for the treatment and care of cripples for the province of Berlin opened an institution on December 1—a combination of clinic and school. The medical department is provided with all modern means of aid. It has at command an aseptic operating room, a room for medical mechanics, apparatus for massage and electrical treatment, an orthopedic work room, a department for hydrotherapy, etc. The pedagogic department is under the charge of an inspector of education and comprises three school classes and a subsidiary class, a class for the so-called Froebel's games, and three workrooms for shoemaking and tailoring. Those children who can not be placed in the school department, receive instruction in the sick ward itself. The industrial training of the boys comprises shoemaking, tailoring, office work, and orthopedics; that of the girls tailoring, art embroidery, housework and office work. The institute has at its disposal 358 beds, but is far from being adequate to the need as, in the district in which the association is active, there have been enumerated 6,617 cripples, 3,857 of whom require institutional care.

Cremation

The legal regulation of cremation in Prussia, which was not formerly permitted, seems to be assured according to the official announcements in the press. Objections are no longer raised by the imperial government to cremation, either from the criminal or the hygienic standpoint.

VIENNA LETTER

(From Our Regular Correspondent)

VIENNA, Dec. 16, 1908.

Fruit Versus Flour

The remarkable weather of the last spring and summer has, according to the reports of the ministry of agriculture, caused an unusual fall in the consumption of wheat and other flour in this country, because the supply of fruit was so abundant that in many districts it completely took the place of bread. The lower classes especially profited by these conditions; apples, pears and plums actually formed the chief

nourishment of many thousands of people. Even in the towns, an unheard-of amount of fruit was consumed. In medical circles the excellent state of the public health prevailing since August is attributed to this accidentally adopted vegetarian diet.

Reinfection with Syphilis

The general interest now taken in researches on syphilis justifies the recording of certain unusual instances of reinfection or superinfection with this disease. Experiments with monkeys have shown that it is possible to make syphilitic virus "take" again in monkeys previously infected with syphilis. Dr. Pollard's observations in a human case, recorded in a letter to the *Wiener klinische Wochenschrift*, is rather an unusual one. The observations are of much importance, since they were corroborated by findings of the *Spirochæta pallida*. The patient had suffered from typical syphilitic primary sore in 1905; had had several attacks of maculo-papulous exanthema, and had received treatment with inunctions and injections with mercury. Nevertheless, in the summer of 1908 he appeared again at the hospital with a typical primary sore on the penis and scleradenitis; there were positive findings of spirochete in the discharge. No secondary manifestations appeared during the time the patient was kept under observation (six weeks). All cases of reinfection reported hitherto, as well as all animal experiments, tend to prove that absence of secondary signs is the rule; the virus can not produce the lesions because the protective properties of the body are again active. The question whether the disease can ever be actually cured, or whether its effects can merely be sufficiently relieved by treatment to allow of a fresh infection has hitherto not been answered. The only thing which can be looked on as certain is that a complete immunization can not be confidently expected.

Pharmacology

MORE CONCERNS DECLARED FRAUDULENT

The Wilson Consumption Cure and the Soluble Sulphur Company Come Under Postoffice Ban

THE "REV. EDWARD A. WILSON" CONSUMPTION "CURE"

A fraud order has been issued by the postoffice authorities against a concern engaged in the "consumption cure" business under the name of Rev. Edward A. Wilson. The individual conducting the business was one C. A. Abbott of Brooklyn, the Rev. Mr. Wilson being a hypothetical personage whose name was used as an advertising "blind." Advertisements were published in newspapers, chiefly in those with a rural circulation, in which the Rev. Mr. Wilson informed the afflicted that "having been restored to health by simple means after suffering for several years with . . . consumption" he was "anxious to make known to fellow sufferers the means of cure." This he offered to do by sending free of charge to all applicants, "a copy of the prescription used, which they will find a cure for consumption, asthma, catarrh, bronchitis" and several other conditions.

Those who answered this advertisement received a large amount of printed matter purporting to come from the Rev. Mr. Wilson. In this the reverend gentleman explained how, when in charge of a church in Maine, he contracted tuberculosis and after trying various treatments, was finally cured by a famous Dr. Churchill of Paris, France. The prescription to which he owed his life he was giving away free in a spirit of thankfulness. But in view of the difficulty experienced in having many druggists fill the prescription, he had imported large quantities of the ingredients direct from Dr. Churchill himself, had had them compounded by a competent chemist, and was prepared to furnish a three weeks' supply of the same to any one who would send him $3.00, including six or twelve cents for postage. As the prescription contained as its essential ingredient "Extract of Blodgetti"—a drug whose existence was as immaterial as that of the Rev. Mr. Wilson—the difficulty in getting it filled was not overestimated.

Investigation showed that there was no "Rev. Wilson"; that the ingredients were not imported; that they were compounded by Abbott himself, who was not a chemist; that there was no "Extract of Blodgetti," and that the advertising "literature" was false and misleading in every respect. Hence the fraud order.

THE OHIO SOLUBLE SULPHUR COMPANY

The Ohio Soluble Sulphur Company of Greenville, Ohio, is another concern that has been suppressed as fraudulent by the postoffice authorities in spite of the efforts of the Physiologic Elements Co. of New York City, whose manager, H. M. Munsell, appeared in behalf of the Ohio company. The Ohio Soluble Sulphur Company also used an imaginary individual in its process of relieving the gullible sick of their money. "F. M. Hill, the world's greatest physiologic chemist" was the straw man in this case, and what Chemist Hill had not discovered in the realm of science—according to the advertisements—was too trivial to mention. But his greatest discovery was the process for making sulphur soluble, a discovery that "meant death to all malignant diseases" and "pure blood for every affected being in the land"—that is, providing such beings could pay $2.00 for a two-ounce bottle. Soluble Sulphur, it should be said, was not a drug or medicine, but a "physiologic element."

"Whatever you may be suffering from, whatever your ills, whether the disease is of bacterial origin, like consumption, or of some chemical origin in the blood like rheumatism, Soluble Sulphur will cure you. There is no disputing this. It is a fact."

The number of morbid conditions in which Soluble Sulphur was indicated is simply marvelous. Space forbids us to list them; it would be easier to detail the pathologic conditions for which it is *not* recommended. Apparently, it is valueless in cases of housemaid's knee or soft corns—in all other morbid states, use it. The omission of these two afflictions, however, should possibly be taken as an oversight rather than as indicating any possible limitation to the therapeutic value of the remedy.

The Bureau of Chemistry, Department of Agriculture, analyzed this preparation and found that the amount of sulphur was less than one-half of 1 per cent.—to be exact, 0.42 per cent. Ninety-eight per cent. of the "remedy" was glycerin. In fact, the public was apparently paying $2.00 for two ounces of glycerin, in which was dissolved a minute amount of ichthyol. This, then, was the wonderful new preparation that was advertised to "positively cure" cancer, rheumatism, sore eyes, barber's itch, spinal meningitis, and other diseases too numerous to mention, and to "destroy blackheads, beautify the complexion, and make the hair soft and glossy."

Fake testimonials were used, of course, and these combined with the false claims and the exploitation of the hypothetical Chemist Hill were the means of the Ohio Soluble Sulphur Company's undoing. The business conducted by this concern was declared to be "a scheme and device for obtaining money through the mails by means of false and fraudulent pretenses, representations and promises," and was therefore suppressed by the postoffice department.

Dewees' Emmenagogue Mixture—A Survival of Polypharmacy

To the Editor:—I want information regarding Dewees' Emmenagogue Mixture:

℞

Tincturæ Cantharidis	f. 3i
Tincturæ Aloes	f. 3ss
Tincturæ Ferri Chloridi	f. 5iii
Tincturæ Guaiaci Ammoniatæ	f. 3iss
Syrupi q. s. ad	3vi

This seems to make a very unpleasant blackish mixture with apparent incompatibility between the iron and guaiac. My pharmacist does not seem to be able to do any better. Can the formula be put up without this reaction?

H. N. WHITELAW, M.D., Cliffs, Wash.

The above mixture is a survival of the polypharmacy introduced by the latter-day Paracelsan School. Evidently the celebrated Dewees, in formulating his prescriptions, did not take into consideration either compatibility or eligibility, as witness his well-known Carminative Asafetida Mixture or his Compound Tincture of Guaiac contained in the National Formulary. The emmenagogue mixture may be made fairly presentable by substituting the Tincture Ferric Citro-Chlorid,

N. F., the so-called "tasteless tincture of iron," for the Tincture of Ferric Chlorid, some honey and Fluidextract of Licorice for part of the syrup, to suspend the resinous constituents and to mask the taste of the aloes and guaiac.

The following modification is suggested:

MISTURA GUAIACI, ALOES, CANTHARIDIS ET FERRI.
(DEWEES' EMMENAGOGUE, MODIFIED.)

R			c.c.
Mellis depurati	fl. ℥i	or	30

To this, contained in a vial, add gradually, previously mixed:

Tincturæ Aloes	fl. ℥ss	or	15
Tincturæ Guaiaci Ammoniatæ	fl. ℥iss		45

Shake after each addition; to this add in the same manner, previously mixed:

Tincturæ Ferri Citro-chloridi	fl. ℥iii	or	12
Syrupi	fl. ℥ii		60

Then add:

Tincturæ Cantharidis	fl. ℥i	or	4
Fluidextracti Glycyrrhizæ	fl. ℥iv		15

Misce bene. Sig.: Shake well.

There is no reason why this combination could not be given in dosage form; that is, in pill or capsule, and the following is suggested:

PILULAE GUAIACI, ALOES, CANTHARIDIS ET FERRI (DEWEES).

R			Gm.
Cantharidis, pulveris	gr. iii		0.2
Aloes	gr. xxiv	or	1.5
Guaiaci	℥iiss		10.0
Pilularum Ferri Carbonatis	℥ii		8.0

Mix and make into a mass. Divide into 100 pills. Put in gelatin capsules or coat with Cacao (see National Formulary, page 121).

Two of these pills are equivalent to about one fluidram of the liquid mixture. They will disintegrate chiefly in the intestinal tract by the alkaline reaction of the secretions and thus insure the most favorable therapeutic action with the least digestive disturbance.

Write-up Manufacture in Germany

The readiness with which some physicians respond to the dishonorable appeals of manufacturers of nostrums is well shown by some quotations from *Der reelle Geschäftsmann*, Cologne, a journal devoted to the exposure of business frauds. These quotations are given in the *Apotheker-Zeitung*, September 30. From this it appears that there was inserted in a reputable journal a short time ago the following notice.

> FOR PHYSICIAN. WANTED: Licensed physicians who are disposed to furnish favorable reports for advertising purposes of a newly introduced chemical preparation of epoch-making importance (germicide). Fee from 500 to 1,000 marks ($120 to $240).

In spite of the insult thus rendered to professional sentiment, a large number of offers from physicians were received in reply to this advertisement. Some were so cautious as to condition their recommendation on the utility of the article and to request the sending of a preliminary sample. But what shall be said of the conscientiousness of a physician and a specialist who writes: "I am not disinclined to give an opinion of your chemical preparation in the manner desired. Please send me further details regarding the scope of the report." Nothing is said of trying the remedy first; a favorable report is assured beforehand. The writer is concerned about the extent of the report because he would rather sell his convictions for 1,000 marks than for 500.

Another physician, the owner of a much-patronized dispensary in a large city, as well as the conductor of a private sanatorium, is still plainer. He is not forced to earn the "tainted" money. He is prepared to give the desired opinion and thinks it will be best for the manufacturer to furnish him the report already prepared, as the manufacturer is the best judge of what is needed. It is impossible to go further. A blank signature is the simplest way and the physician hands over his conscience done up in a brown paper parcel.

That the medical men who are willing thus to sacrifice their professional honor are not fair examples of the German medical profession goes without saying. This is shown when we learn other aspects of the character of those who thus offer their services.

In the first article, *Der reelle Geschäftsmann* scores physicians without mentioning names, but in a later issue it is more specific and gives the names of Thisguens, a notorious Cologne "specialist" in skin and venereal diseases, who has attracted attention by publishing in advertisements his recommendation of a secret remedy for rheumatism. He is also willing to supplement his income from his special practice by giving his favorable opinion of the "germicide" for the net fee of 500 to 1,000 marks.

Correspondence

The Quantitative Estimation of Albumin in Urine

ST. LOUIS, Dec. 22, 1908.

To the Editor:—There is still lacking a practical and reliable method of determining the percentage of albumin in urine. The phosphotungstic method has been resurrected lately.

Edward H. Goodman and Suzanne Stern published in THE JOURNAL (July 4, 1908, li, 38) an article on "A New Method for the Quantitative Estimation of Albumin in Urine," describing the Tsuchiya modification of the phosphotungstic test. Henry R. Harrower refers to the same solution (THE JOURNAL, Oct. 31, 1908, li, 1511) under the name of "Goodman's reagent" (omitting the name of Suzanne Stern). In another paper (THE JOURNAL, Dec. 12, 1908, li, 2055) Goodman and Stern give due credit to Tsuchiya and his investigations. They describe at greater length a method similar to the Heller test as modified by Roberts and others (von Jaksch: "Klinische Diagnostik," 1901, p. 391).

I do not believe that their assertion is correct, that "the Esbach method has for a generation been firmly established in every laboratory." The majority of physicians have been taught and know that the Esbach method is not reliable and could be used only for comparing increase or decrease of albumin in urine.

The results as tabulated by the above-named authors do not impress the reader as very exact. Where the differences between titration after the Tsuchiya-Goodman-Stern method and their own gravimetric findings exceed 50 to 150 per cent. (for instance Nos. 6, 7, 13, 22, etc., of their table) the results might be called "startlingly" inexact.

It would seem that the authors have not consulted Neubauer and Vogel's "Analyse des Harns" thoroughly. There they will find on pages 255-256 that phosphotungstic in presence of mineral acids will precipitate not only albumin, albumoses and peptones, but also xanthin bases, uric acid, kreatinin, etc., diamins, etc., urine pigments, potassium and ammonia. Such facts render their method just as uncertain as most of the older ones. Almost all normal urines will give the precipitate after a short while. It is to be hoped that, in the future communication which Goodman and Stern promise, that source of error will be eliminated.

GEORGE RICHTER.

[Proof of the above was sent to Dr. Goodman, who replies as follows]:

The contention of Dr. Richter that the method of determining the quantity of albumin in urine, described by Miss Stern and me, is similar to Roberts' test, I do not believe requires any discussion, as I am unable to see in just what particular the two methods resemble each other.

Dr. Richter's second contention, that my assertion pertaining to the universal use of the Esbach method is incorrect, may be justifiable, as I admit "every laboratory" is rather sweeping. Certain it is, however, that every laboratory I have seen in Germany and in the United States depends on the Esbach albuminometer for the routine albumin estimation. The statement that the majority of physicians know that the Esbach method is not reliable, I regard as just as sweeping as my assertion that Dr. Richter criticizes, for I know of no laboratory, private or otherwise, in Philadelphia at least, which does not make determinations of albumin by means of the Esbach albuminometer, in the original or in some modified form. Reports are constantly being published in the German journals of cases in which the albumin has been estimated by

the method, and in the domestic journals, when a method is specified, I have found the Esbach method used as a *sine qua non* of a urinary examination. I do not believe physicians wittingly subscribe to an error.

I have consulted Neubauer and Vogel's "*Analyse des Harns*" repeatedly and very thoroughly. As our method requires rarely more than 0.5 c.c. of urine, corresponding to 0.2 pro mille albumin, and in cases of pronounced albuminuria usually much less (0.05 c.c. urine corresponding to 2. pro mille albumin) it must be apparent that the amount of albumose, peptones, xanthin bases, uric acid, kreatinin and other substances precipitated by our solution, contained in 0.05 c.c. urine, must be very small. I do not know how sensitive to these substances Tsuchiya's solution of phosphotungstic acid is, and should be pleased to be enlightened on this point.

"Almost all normal urine will give a preciptate after a short while" is a statement which may or may not be true, and I should like further information as to just how long a "short while" is, I would inform my critic, however, that I have met with no "normal" urine that gives a precipitate in the few (10 to 30) seconds it takes me to make my test.

Nutmeg Poisoning.

PUKEKOHE, NEW ZEALAND, Oct. 26, 1908.

To the Editor:—The other day I had a patient who took at one dose, on an empty stomach, a freshly ground nutmeg, followed by a heavy meal. When I reached her five hours after the administration of the nutmeg, the woman was in a state of collapse. The pulse was 50 and very feeble. The respirations were between 30 and 40 and every second or third breath was a sigh. The skin and extremities were cold and the face flushed and mottled. The temperature was 95.

I gave 1/30 of a grain of strychnin sulphate hypodermically every three hours and 7½ grains ammonium carbonate with 20 minims each of spirits of ether and spirits of chloroform every four hours. I placed hot bottles all around the body and gave a cup of hot milk every half hour. The patient's pulse and temperature returned to normal in twenty-four hours. She then seemed fully recovered, has since improved, and now is as before the dose.

She took the nutmeg to check profuse and irregular menstruation. Once previously she had taken a much smaller dose for the same purpose with the desired result, and now having a worse attack, she took a larger dose, reasoning, no doubt, that if a little was good, much was better.

I can find nothing satisfactory about nutmeg poisoning in my books and wonder if there is any record of a similar case.

JOHN S. REEKIE, M.D., Ch.M.

Overrated Prospects for Physicians in Nevada

FALLON, NEV., Dec. 18, 1908.

To the Editor:—The literature sent out by the Reclamation Service on the Tucker-Carson Irrigation Project has induced nine physicians to come here and locate among a population of but few over 2,000, and not growing any.

Almost weekly, some eastern physician comes out at considerable expense and finds that here there are at least seven physicians more than the place needs. It is much the same all over Nevada, and this communication is written in the hope that it will save money for a class of professional men who have little to throw away.

JOHN E. WORDEN.

Correction in Hemolysis Article

CLEVELAND, OHIO, Dec. 21, 1908.

To the Editor:—I desire to correct an error in my article on hemolysis, published in THE JOURNAL, Dec. 12, 1908, under the subdivision, "Setting Up the Test." The serum for the control test should be heated at 55 degrees C. for ten minutes before the corpuscles are added. The tubes should then be placed in the refrigerator with the heated tubes until all are of the same temperature. Should the corpuscles be heated, as wrongly stated in my previous description, they would be hemolyzed by the heat alone.

G. W. CRILE.

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS will not be noticed. Queries for this column must be accompanied by the writer's name and address, but the request of the writer not to publish name or address will be faithfully observed.

HYDRARGYRUM SUCCINIMIDUM IN TUBERCULOSIS

LAS ANIMAS, COLO., Dec. 14, 1908.

To the Editor:—Permit me to reply to the letter by Dr. Henriksen, in THE JOURNAL, Dec. 12, 1908, on the above-named subject. Had Dr. Henriksen carefully read my article in the *U. S. Naval Bulletin* for April, 1908, he would have seen that I consider any salt of mercury which can be administered by intramuscular injection a strong antituberculous agent, and that I use the succinimid of mercury because from long experience and observation I believe it possesses qualities which render it more advantageous than other salts of mercury in the treatment of both tuberculosis and syphilis by hypodermic injection. Mercury given by mouth or by inunction is of little, if any, value in the treatment of tuberculous infection.

B. L. WRIGHT, M.D.

CLEVELAND, OHIO, Dec. 11, 1908.

To the Editor:—In THE JOURNAL December 12, is a letter by H. K. Henriksen criticizing the recommendation of the use of hydrargyrum succinimidum, on the ground that it is a very rare salt, difficult to obtain, and little known. It seems to me that Dr. Henriksen is a little hasty in his conclusions. In 1903, when I was at Ehrmann's clinic, he recommended this salt as by far the best soluble form of mercury, on account of its easy solubility, the large dosage possible, its painlessness and its freedom from liability to cause abscesses. I have used it myself for nearly five years and so have many others who are familar with the treatment of syphilis. It can readily be obtained and its price is such as to preclude any undue advantage being taken by the manufacturers.

W. E. SAMPLINER, M.D.

DEATHS OF PHYSICIANS FROM ACCIDENTS AND SURGICAL OPERATIONS

To the Editor:—Perusal of the death list of THE JOURNAL indicates to me that more than 10 per cent. of all deaths among physicians result from accidents and surgical operations. Why is it? It would seem that such men should be nearly free from such conditions.

E. K. ABBOTT, M.D., Monterey, Calif.

ANSWER.—We agree that deaths of physicians from accidents and surgical operations seem frequent. Reduced to actual percentages, however, they are not so frequent as our correspondent suggests. Each year we give a summary of the deaths of physicians for the previous year. The summary for 1908 appears in the editorial department of this issue, page 52.

For the last three years violence, which includes homicide and suicide, has caused very nearly 7 per cent. of the deaths among physicians; namely, 6.75 per cent. in 1905, 6.98 per cent. in 1906, 7 per cent. in 1907 and 7.6 per cent. in 1908. Operations were assigned as the cause of death in 2.59 per cent. in 1905, in 0.93 per cent. in 1906, and in 0.66 per cent. in 1908.

The physician's calling is attended with considerable danger: he travels a great deal; he deals with violent persons, including criminals, the insane, and those who are delirious from disease. Health officers necessarily incur the enmity of the ignorant, who object to sanitary restrictions. In this connection is of interest the report of an address by Mr. Kipling and some comments thereon, which were quoted in THE JOURNAL, Nov. 14, 1908, page 1719.

LAWS AND LITERATURE ON TUBERCULOSIS

To the Editor:—Please refer me to the literature dealing with the legislation in various states against the spread of tuberculosis.

WATSON S. RANKIN, M.D., Wake Forest, N. C.

To the Editor:—Can you tell me where I can secure cards and pamphlets for distribution to tuberculosis patients giving hints as to proper care in the home?

ARTHUR BOWLES, M.D., Eleva, Wis.

ANSWER.—Each of the above correspondents will find an answer to his question in "The Campaign Against Tuberculosis in the United States." This valuable and interesting book, reviewed Nov. 21, 1908, p. 1798, can be obtained for one dollar from the Charities Publication Society, 125 E. 22d St., New York City. The price is merely a nominal one since the expense is in part met by an endowment fund. The book contains a summary of the laws of each state and enumerates and describes all the antituberculosis sanitariums and societies of the United States. From some of the latter, one may secure advice and samples of antituberculosis literature, including cards and pamphlets.

HYPODERMIC INJECTIONS OF CALOMEL IN SYPHILIS

———, Dec. 12, 1908.

To the Editor:—Please give the details of the treatment of syphilis by injection of calomel.

K. L.

ANSWER.—The calomel should be suspended in water by means of mucilage of acacia, in oil, or in petrolatum or glycerin. The dose for a single injection should be from one to three grains,

given once or twice weekly. The syringe should have a needle larger than the ordinary hypodermic needle. The injection should be made into the gluteal muscles, with strict aseptic precautions, and the needle should enter the muscle before the fluid is injected. The following formula is recommended for mercury salicylate. Calomel could be substituted for the mercury salicylate:

R.	gm. or c.c.	
Hydrargyri salicylatis (vel chloridi mitis)	1 | 5	gr. xxiij
Adipis lanæ hydrosi	1	gr. xv
Olei olivæ	8	m.ccxviij

INROADS OF WORMS ON FAMILY PRACTICE

BEREA, OHIO, Dec. 21, 1908.

To the Editor:—The item on worms in THE JOURNAL, December 19, is worthy of the attention of every family physician. The symptoms attributed by the laity to worms, such as grinding the teeth, picking the nose, starting up with loud screams when asleep, etc., are all reflex symptoms indicating intestinal irritation, caused, however, far more often by fermenting and undigested food than by worms. WILLIAM M. GREGORY.

STATE BOARD RECIPROCITY WITH GEORGIA

BOSTON, Dec. 18, 1908.

To the Editor:—Kindly state what states reciprocate with Georgia, and on what basis. R. L. CLEBORNE, M.D.

ANSWER.—Georgia reciprocates with Indiana on the basis of an examination only, and with Iowa, Kentucky, Maryland, Michigan, Nebraska, Nevada, Virginia, West Virginia and Wisconsin, on the basis either of a diploma or of an examination.

The Public Service

Army Changes

Memorandum of changes of stations and duties of medical officers, U. S. Army, Dec. 26, 1908:

Richardson, G. H., M. R. C., relieved from duty at the Presidio of San Francisco, and ordered to sail January 5 for duty in the Philippines Division.

Lamson, T., captain, relieved from duty at Fort Bliss, Texas, and ordered to Columbus Barracks, Ohio, for duty.

Field, P. C., captain, granted leave of absence for fourteen days.

Greenleaf, H. S., captain, granted sick leave of absence to Jan. 22, 1909.

La Garde, L. A., Appel, A. H., Ebert, R. G., Carter, E. C., lieutenant colonel, ordered to Fort Robinson, Nebr., for general court martial duty, Jan. 6, 1909.

Wren, R. J., M. R. C., granted an extension of one month to his sick leave of absence.

Leech, W. F., M. R. C., honorably discharged from the service of the United States.

Peck, L. B., M. R. C., granted leave of absence for ten days.

Hussey, S. W., dental surgeon, granted leave of absence for one month, twenty-three days.

Tignor, E. P., dental surgeon, left Fort McHenry, Md., for duty at Fort Monroe, Virginia.

Navy Changes

Changes in the Medical Corps, U. S. Navy and Marine Corps, for the week ending Dec. 26, 1908:

Mayers, G. M., P. A. surgeon, detached from the naval recruiting station, Baltimore, and ordered to the naval medical school hospital, Washington, D. C., for treatment and observation.

Brooks, F. H., asst.-surgeon, detached from the *Franklin* and ordered to the naval recruiting station, Baltimore.

Huffman, O. V., asst.-surgeon, ordered to the naval medical school hospital, Washington, D. C., for treatment and observation.

Thompson, F. W., acting asst.-surgeon, ordered to the naval hospital, New York.

Public Health and Marine-Hospital Service

List of changes of stations and duties of commissioned and other officers of the Public Health and Marine-Hospital Service for the seven days ended Dec. 23, 1908:

Mead, F. W., surgeon, granted 2 days' leave of absence from Dec. 25, 1908.

Oakley, J. H., passed asst.-surgeon, granted 2 days' leave of absence from Dec. 18, 1908.

Cummings, Hugh S., passed asst.-surgeon, leave of absence for one month from Oct. 29, 1908, granted Sept. 2, 1908, amended to read 26 days from Oct. 29, 1908.

Billings, W. C., passed asst.-surgeon, granted 14 days' leave of absence from Dec. 25, 1908.

Korn, W. A., passed asst.-surgeon, granted 10 days' leave of absence from Dec. 24, 1908.

Creel, R. H., passed asst.surgeon, granted 7 days' leave of absence from Dec. 21, 1908, under paragraph 191 of service regulations.

Frost, W. H., asst.-surgeon, directed to report to Surgeon G. W. Stoner, chairman board of examiners Jan. 12, 1909, to determine his fitness for promotion to the grade of passed asst.-surgeon.

Mullan, E. H., asst.-surgeon, directed to report to Surgeon G. W. Stoner, chairman board of examiners Jan. 12, 1909, to determine his fitness for promotion to the grade of passed asst.-surgeon.

Kastle, Jos. H., chief division of chemistry, Hygienic Laboratory, granted 10 days' leave of absence from Dec. 15, 1908.

Blanchard, J. F., acting asst.-surgeon, granted 2 days' leave of absence from Dec. 17, 1908.

Bowers, Paul E., acting asst.-surgeon, granted 7 days' leave of absence from Dec. 17, 1908, under paragraph 210 of service regulations.

Whight, S. D., acting asst.-urgeon, granted 3 days' leave of absence from December 24, 1908, without pay.

Wakefield, H. C., acting asst.-surgeon, granted 6 days' leave of absence from Dec. 14, 1908, under paragraph 210 of service regulations.

Walkley, W. S., acting asst.-surgeon, granted 7 days' leave of absence from Dec. 23, 1908.

Health Reports.

The following cases of smallpox, yellow fever, cholera and plague have been reported to the Surgeon-General, Public Health and Marine-Hospital Service during the week ended Dec. 25, 1908:

SMALLPOX—UNITED STATES

California: San Diego County Nov. 1-30, 11 cases; San Francisco Nov. 27-Dec. 3, 7 cases.

Indiana: Elkhart, Dec. 6-12, 1 case; Lafayette Dec. 8-14, 6 cases.

Kansas: Kansas City Dec. 13-19, 2 cases.

Texas: San Antonio Dec. 6-12, 1 case.

Utah: Salt Lake City Nov. 1-30, 36 cases.

Wisconsin: La Crosse Dec. 6-12, 2 cases; Milwaukee Dec. 22-28, 3 cases.

SMALLPOX—FOREIGN

Algeria: Algiers Nov. 1-30, 20 deaths.

Brazil: Bahia Nov. 7-14, 51 cases, 2 deaths; Pernambuco Oct. 16-31, 24 deaths; Rio de Janeiro Nov. 9-15, 311 cases, 141 deaths.

Canada: Kingston Nov. 23-29, 2 cases.

India: Bombay Nov. 16-24, 1 death.

Mexico: Veracruz Dec. 6-12, 1 case.

Peru: Lima Nov. 15-21, 1 case.

Russia: Moscow Nov. 22-28, 9 cases, 3 deaths.

Spain: Valencia Nov. 22-28, 3 cases.

Turkey: Constantinople Nov. 28-Dec. 6, 9 deaths.

CHOLERA

Japan: Fuoko ken Sept. 15-25, 49 cases, 22 deaths; Oita ken Jan. 1-Nov. 15, 7 cases, 4 deaths; Saga ken to Nov. 15, 2 cases; Tsushima Oct. 20-31, 70 cases.

Korea: General, Oct. 21-Nov. 15, 31 cases, 2 deaths.

Philippine Islands, Manila: Oct. 25-31, 45 cases, 23 deaths.

YELLOW FEVER

Mexico: Merida Nov. 29-Dec. 5, 3 cases; Veracruz, 4 cases, 3 deaths; Zumpich, Nov. 1-30, 2 cases.

PLAGUE

Brazil: Pernambuco Oct. 1-31, 3 deaths.

Chili: Iquique Nov. 1-6, 1 case.

China: Hong Kong Nov. 1-7, 1 case, 1 death.

Ecuador: Guayaquil Nov. 22-28, 2 deaths.

Peru: Lima Nov. 5-11, 5 cases, 1 death.

Medical Education and State Boards of Registration

COMING EXAMINATIONS

ARIZONA: Phoenix, Jan. 4-5. Sec., Dr. Ancil Martin.

ARKANSAS: Little Rock, Jan. 12. Secretaries: Regular, Dr. F. T. Murphy, Brinkley; Homeopathic, Dr. P. C. Williams, Texarkana; Eclectic, Dr. A. J. Widener, Little Rock.

COLORADO: Denver, Jan. 5. Sec., Dr. S. D. VanMeter, 1723 Tremont St.

DISTRICT OF COLUMBIA: Washington, Jan. 12. Sec., Dr. George C. Ober, 210 B. St., S. E.

ILLINOIS: Coliseum Annex, Chicago, Jan. 18-20. Sec., Dr. J. A. Egan, Springfield.

MINNESOTA: Old Capitol, St. Paul, Jan. 5. Sec., Dr. W. S. Fullerton, 214 American National Bank Building.

NEW MEXICO: Santa Fe, Jan. 11. Sec., Dr. J. A. Massie.

NORTH DAKOTA: Grand Forks, Jan. 5-7. Sec., Dr. H. M. Wheeler.

OKLAHOMA: Chickasha, Jan. 12. Sec., Dr. Frank P. Davis, Enid.

RHODE ISLAND: 313 State House, Providence, Jan. 7-8. Sec., Dr. Gardner T. Swarts.

SOUTH DAKOTA: Sioux Falls, Jan. 13-14. Sec., Dr. H. E. McNutt, Aberdeen.

VERMONT: Montpelier, Jan. 12-14. Sec., Dr. W. Scott Nay, Underhill.

WASHINGTON: Spokane, Jan. 5-7. Sec., Dr. Kenneth Turner, Walker Bldg., Seattle.

WISCONSIN: Milwaukee, Jan. 12-14. Sec., Dr. J. V. Stevens, Jefferson.

Reciprocity in Illinois

The Illinois State Board of Health now reciprocates under certain conditions, with the following state boards, in the case of licenses issued after examination: Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Michigan, Minnesota, Nebraska, Nevada, New Jersey, North Dakota, Ohio, Tennessee, Texas, Utah, Vermont, West Virginia, Wisconsin and Wyoming.

Idaho October Report

Dr. W. F. Howard, secretary of the Idaho State Board of Medical Examiners, reports the written examination held at Boise, Oct. 6-7, 1908. The number of subjects examined in

was 11; total number of questions asked, 110; percentage required to pass, 75. The total number of candidates examined was 44, of whom 31 passed and 13 failed. The following colleges were represented:

College.	Year Grad.	Per Cent.
PASSED		
Colorado School of Med.	(1897) 79.2; (1908)	86.3
Hahnemann Med. Coll., Chicago	(1904)	88.3
Chicago Homeopathic Med. Coll.	(1904)	85.2
College of P. and S., Chicago	(1908) 77.6,	78.7
Northwestern Univ. Med. School	(1896) 75; (1898) 77.1; (1908)	84.7
Rush Med. Coll.	(1905)	84.8
Keokuk Med. Coll., Coll. of P. and S.	(1908)	82.5
Louisville Med. School	(1883)	76.4
Harvard Med. School	(1896)	80.6
University of Minnesota	(1904) 77.3; (1905)	77.1
Minneapolis Coll. of P. and S.	(1908) 82.4,	83.7
Missouri Med. Coll.	(1897)	77.7
St. Louis University	(1908)	78.3
Barnes Med. Coll.	(1908) 78.4,	80.4
Creighton Med. Coll.	(1907) 81.6,	83.1
Albany Med. Coll.	(1907)	83
Cleveland Coll. of P. and S.	(1907)	75
Jefferson Med. Coll.	(1907)	83.9
Medico-Chirurgical College, Philadelphia	(1904)	79.7
University of Pennsylvania	(1908)	85.4
University of Toronto	(1907)	81.5
Trinity Med. Coll.	(1904)	80.1
University of Christiania, Norway	(1905)	83.2
FAILED		
George Washington University	(1907)	71.2
Bennett Coll. of Ecl. Med. and Surgery	(1894)	63.8
College of P. and S., Chicago	(1885) 67; (1894)*	
Hahnemann Med. Coll., Chicago	(1903)	73.5
Barnes Med. Coll.	(1904) 71; (1907) 72.6; (1908)	60.9
St. Louis University	(1908)	70.8
St. Louis College of P. and S.	(1903)	40.9
Long Island Coll. Hosp.	(1876)	66.5
Medical Coll. of Ohio	(1882)	72
Vanderbilt University	(1900)	67.2

* No grade given.

Maine November Report

Dr. William J. Maybury, secretary of the Maine Board of Registration of Medicine, reports the written examination held at Portland, Nov. 10-11, 1908. The number of subjects examined in was 12; total number of questions asked, 90; percentage required to pass, 75. The total number of candidates examined was 21, of whom 13 passed and 8 failed. The following colleges were represented:

College.	Year Grad.	Per Cent.
PASSED		
Baltimore Med. Coll.	(1907) 83.8; (1908) 88.8,	89.3
Tufts Coll. Med. School	(1907) 84.4, 88.2; (1908) 80.2,	86.1
College of P. and S., Boston	(1906) 83.9; (1908)	75.2
Dartmouth Med. School	(1907)	88.2
Jefferson Med. School	(1908)	94.3
University of the South	(1905)	79.8
University of Vermont	(1908)	91.4
FAILED		
Medical School of Maine	(2, 1908)*	
Baltimore University	(1897)*	
Tufts Coll. Med. School	(1908)*	
College of P. and S., Boston	(2, 1908)* (1908)	67
Harvard Med. School	(1907)*	

* Made less than 60 per cent. in one branch.

Marriages

C. Z. W. REIGER, M.D., to Miss Ella Arbuckle, both of Philadelphia, December 16.

CLEMENS RUCKER, M.D., to Miss Lorine Strahm, both of Sabetha, Kan., November 26.

ALVIN G. LUESCHEN, M.D., to Miss Gertrude Elias, both of Columbus, Neb., November 24.

JACOB L. SANDOE, M.D., Cincinnati, to Miss Louise H. Laick, of Tarrytown, N. Y., December 15.

PARKER MARTIN CORT, M.D., to Miss Helen Elizabeth Royce, both of Springfield, Mass., December 12.

H. MAXEY ROBERSON, M.D., Kansas City, to Miss Buena Myers, of Pikeville, Tenn., November 11.

DAVID BERNER, M.D., Atlantic City, N. J., to Miss Melen McCarthy, of Massachusetts, December 12.

W. R. CALLIHAN, M.D., Prestonsburg, Ky., to Miss Gertrude A. Nelson in New York City, December 11.

EDWARD ALLEN LOCKE, M.D., Boston, to Miss Elizabeth Gilmore Ferguson, of Washington, December 5.

JAMES EDGAR PAULLIN, M.D., Atlanta, to Miss Edna Louise Frederick of Marshallville, Ga., December 17.

WALLACE BOYD RUSSELL, M.D., Chicago, Ill., to Miss Elizabeth Hutchinson, of Dyer, Tenn., December 24.

CLIFTON R. WALLACE, M.D., Leesburg, Va., to Miss Edith Lillian Willingham, at Washington, December 15.

P. E. JAMES, M.D., to Miss Cecelia Marie Johnson, both of Kimballton, Iowa, at Elkhorn, Iowa, December 7.

WILLIAM CHARLES ROBERT TURNBULL, M.D., to Miss Eula Helen Glover, both of Langley, S. C., December 16.

MIHRAN K. KASSABIAN, M.D., Philadelphia, to Miss Verkin Giragosian, of Constantinople, Turkey, December 2.

PEREGRINE WROTH, JR., M.D., Hagerstown, Md., to Miss Wye Townsend Lower, at Washington, D. C., December 18.

Deaths

Charles Graham Cannaday, M.D. St. Louis College of Physicians and Surgeons, 1889; a member of the American Medical Association; formerly president of the Roanoke (Va.) Academy of Medicine and the Medical Society of Virginia; founder and director of the Rebecca Sanitarium, Roanoke; died suddenly in that institution, December 17, from heart disease; aged 48. At a special meeting of the Roanoke Academy of Medicine, December 20, resolutions were adopted expressive of regret and sympathy at his death, and testifying to the brilliancy, fidelity, judgment and ability of its late member.

Richard Alexander Fullerton Penrose, M.D. University of Pennsylvania, Philadelphia, 1849; LL.D. Dickinson College, 1872; one of the founders of the American Gynecological Society; professor of obstetrics and diseases of women and children in the University of Pennsylvania, from 1863 to 1889; and emeritus professor thereafter; a founder of the Childrens' Hospital, the Hospital of the University of Pennsylvania, and the Gynecean Hospital; consulting surgeon to the Philadelphia Hospital; a member of many learned societies; died at his home in Philadelphia, December 26, from pneumonia, aged 81.

John M. Shepherd, M.D. New York University, New York City, 1890; formerly of Madison, Conn.; since 1902 a contract surgeon in the U. S. Army; and who was commissioned First Lieutenant in the Medical Reserve Corps in July last; a member of the Connecticut State Medical Society and the Association of Military Surgeons of the United States; formerly health officer of Madison, Conn.; and coroner of New Haven county; recently stationed at Fort Douglas, Utah; died in Holy Cross Hospital, Salt Lake City, December 11, after an operation for appendicitis, aged 44.

Joseph Fowler, M.D. University of Buffalo, N. Y., 1873; a member of the Medical Society of the State of New York and the Buffalo Academy of Medicine; for ten years a member of the medical staff of the Sisters of Charity Hospital, and for twenty-two years police surgeon of Buffalo; from 1881 to 1884, one of the coroners of Erie County; died at his home in Buffalo, December 17, aged 61.

Hugh W. Tate, M.D. Medical College of Virginia, Richmond, 1862; a member of the school board of Bolivar, Tenn., and surgeon of the Fifty-fourth North Carolina Infantry, C. S. A., during the Civil War; a member of the American Association of Railway Surgeons, and a beloved and honored practitioner; died at his home, December 15, aged 68.

Horace Grant Sigman, M.D. Colorado School of Medicine, Boulder, 1895; a member of the Colorado State Medical Society; health officer of Otero county for two terms; surgeon to the American Beet Sugar Company, Rocky Ford; died at his home in that city, December 16, from pneumonia, aged 38.

James Samuel Clark, M.D. College of Physicians and Surgeons, New York City, 1882; a member of the board of U. S. pension examining surgeons of Hampden County, Mass., and surgeon to Noble Hospital, Westfield; died at his home in that city, December 20, from pernicious anemia, aged 54.

Elias Buell Heady, M.D. Yale Medical School, New Haven, Conn., 1872; medical examiner for the coroner of New Haven County; and health officer of Milford, Conn.; died at his home, December 16, from the effects of injuries received in an automobile accident three years before, aged 62.

Samuel Gluck, M.D. University of Vienna, Austria, 1871; a member of the American Medical Association, and German Medical Society of New York; for a number of years on the staff of Mount Sinai Hospital; died at his home in New York City, December 17, from heart disease, aged 63.

John Hammond Burkhalter, M.D. New York University, New York City, 1890; a member of the South Carolina Medical Association, and proprietor of the Alma Sanitarium, Columbia, S. C.; died in that institution, December 18, from nephritis, aged 39.

Joseph Ferdinand Rioux, M.D. Laval University, Quebec, 1895; of Sherbrooke, Que.; died in the Hôtel Dieu, Levis, December 16, from the effects of stab-wounds, said to have been self-inflicted while temporarily insane.

James Faucette Atkinson, M.D. University of Georgia, Augusta, 1860; surgeon in the Confederate service during the Civil War; died suddenly at his home near Richburg, S. C., April 14, from heart disease, aged 73.

James D. Heathman (license N. C., 1899), of Mooresville, N. C.; a member of the Medical Society of the State of North Carolina; died in the Long Sanatorium, Charlotte, from hemorrhage, December 17, aged 35.

George W. Sanor, M.D. Western Reserve Medical College, Cleveland, about 1858; formerly a practitioner of Columbiana county, Ohio; died November 18, at the Massillon State Hospital, from paresis, aged 73.

James E. Gee, M.D. University of Michigan, Ann Arbor, 1873; died at his home in Denver, December 13, from the effects of strychnin, believed to have been taken with suicidal intent, aged 59.

William Lattimore Gilbert, M.D. Hahnemann Medical College, Philadelphia, 1885; a member of the Iowa State Medical Society; died suddenly in his office in Goodell, December 12, aged 44.

Francis Jacob Gish, M.D. Rush Medical College, Chicago, 1900; a member of the Colorado State Medical Society; died at his home in Olathe, September 17, from brain tumor, aged 32.

Augustus Henry Julius LePlongeon, a noted archeologist, for many years a practitioner of California and Peru; died at his home in Brooklyn, December 13, from heart disease, aged 83.

David L. Spaulding, M.D. Eclectic Medical College of the City of New York, 1875; was found dead in his house in Niverville, N. Y., from heart disease, December 22, aged 70.

Isaac K. Frazer (years of practice, Texas), a member of the State Medical Association of Texas, and a Confederate veteran; died at his home in Rusk, November 12, aged 71.

R. H. Johnson, M.D. Memphis (Tenn.) Hospital Medical College, 1904; a city physician of Savannah, Ga.; died at his home in Savannah, December 16, from acute gastritis.

Herman Fischer, M.D. Hahnemann Medical College, Chicago, 1880; formerly of Pomeroy, Iowa; died at his home in Corning, Cal., November 29, aged 72.

Orrin P. Smith, M.D. Starling Medical College, Columbus, Ohio, 1884; died suddenly from heart disease at his home in Lenora, Kan., December 14, aged 50.

George W. Doyle, M.D. Jefferson Medical College, Philadelphia, 1881; died at his home in Albany, Mo., December 16, from pneumonia, aged 56.

Henry LaHann, M.D. Albany (N. Y.) Medical College, 1878; died at his home in Burlington, Wis., December 16, from dropsy, aged 52.

Lines Krebs, M.D. Milwaukee College of Physicians and Surgeons, 1883; died at his home in Waukesha, Wis., in July, aged 63.

William H. Shaw (license, Ill.), died at his home in Roscoe, Ill., December 13, from dropsy, aged 83.

Charles Edward Beevor, M.D. University of London, 1881; M.R.C.P., London, 1882; F.R.C.P., London, 1888; one of the most notable investigators in the field of neurology in Great Britain; who read by invitation a paper on "The Coordination of Single Muscular Movements in the Central Nervous System" before the Section on Nervous and Mental Diseases of the American Medical Association at the Chicago session; died suddenly at his home in London, December 5, from atheromatous disease of the coronary arteries, aged 54. Soon after his graduation Dr. Beevor became resident medical officer at the National Hospital for the Paralyzed and Epileptic, London, and after the termination of this appointment, was made assistant physician to the hospital, and later physician. Although he devoted himself principally to neurology, he was interested in the entire field of medicine and was for several years physician to the Great Northern Central Hospital, London. Most of his original work was communicated to the Royal Society, but he was appointed Croonian lecturer to the Royal College of Physicians in 1903, and there communicated the results of his prolonged researches, clinical and experimental, on "Muscular Movements and Their Representation in the Central Nervous System." The same year he gave the Lettsomian lectures before the Medical Society of London, which dealt with the diagnosis and localization of cerebral tumors. His last scientific communication made to the Royal Society was on the "Distribution of Arteries Supplying the Human Brain." In addition to the society memberships already mentioned, he was a member of the Royal Society, the Ophthalmological and Physiological societies, a corresponding member of the Biologic Society of Paris, and was president of the London Neurological Society in 1907. On December 4, apparently in his usual health, he attended the annual dinner of the Royal Society of London, but died in the early hours of the next day.

Medical Economics

THIS DEPARTMENT EMBODIES THE SUBJECTS OF ORGANIZATION, POSTGRADUATE WORK, CONTRACT PRACTICE, INSURANCE FEES, LEGISLATION, ETC.

Contract Practice and How It Works in One Town

A letter from a correspondent in a large western city gives such a graphic and instructive description of the workings of lodge practice, that it seems worthy of publication. In spite of all that has been said on this subject, many physicians do not yet realize the actual dangers connected with contract practice and the evils which unavoidably grow out of it. To those who have not yet carefully considered the matter, we commend the following, which has been changed only enough to make identification of the writer and of the city impossible, for obvious reasons:

"Here in ——— all miners pay $1.00 per month into the hospital. This is all right, but the members of the ——— lodge, for $1.00 a month dues, have a free doctor for themselves and family. They also receive $7.50 per week sick benefit and $100.00 for funeral expenses in case of death, all for $1.00 a month. The doctor gets fifty cents every three months for taking care of the member and his entire family. This lodge has about 1,500 members now and is taking in new members at the rate of thirty a month. Nine-tenths of these new members come right out and say, 'No man can afford not to belong to that lodge,' and that they are joining it solely for the benefits received through the free medical services. Now, a young doctor comes along and finds everybody provided with free medical services by contract except a few such people as cooks, waiters, barbers, bartenders, etc., every one of whom draws from $25.00 a week up in wages. So the young doctor figures that if a man who has been in practice for years can afford to do the lodge work for fifty cents every three months, he certainly can afford to take care of a cook, a waiter, a barber, or a bartender, as well as his family, for $4.00 a year. So he puts such a proposition before the union and they vote to accept it. Thus a bartender who gets $4.50 for every day he works, pays $4.00 a year for medical services for himself and his entire family. This covers everything except the wives and children of the miners. Now come along several doctors who must make a living some way. As every one in town already has one or more free doctors, the men who are not in lodge practice or who do not hold positions as physicians for any unions, get out little tickets and have men and women go from house to house on commission selling these tickets to the wives and children of the miners for twenty-five cents a month, the tickets being good for unlimited medical services on presentation, so there is practically not a person in ——— who has not from one to three free doctors whom he can call on. No one can blame the people for availing themselves of such opportunities, but where will it end? The conditions are certainly growing worse. No one here is making any money except advertising quacks. Can't something be done to stop this? I

have talked with the physicians doing this class of work and they all say that if they were assured that no other doctor would take it up, they would quit, but they will not quit, only to have some one else take it at the same figure."

We have emphasized again and again the evils and dangers of lodge practice. It is not the fact that the contract exists, but it is the terms on which the contract is made which are objectionable. To the physician, such an arrangement is degrading and suicidal so far as professional self-respect and progress are concerned. To the patient it is unjust and dangerous, since professional services at $2.00 a year are not only of little value to him but are an actual menace. To the labor union, such a contract is a prostitution of its cardinal principles, i. e., a fair return for a fair amount of services. It would be difficult for a labor union man to reconcile the payment of a fixed pittance for an indefinite amount of work with the principles regarding his own compensation advocated by his union. The only party which seems to profit by the transaction is the fraternal order which assesses its members $1.00 per month and farms out the physicians' services to them at a cost of fifty cents a quarter. So long as there are physicians whose moral, mental and professional level is such that they are willing to become bond servants for the profit of exploiters of the profession, so long will there be men to take such positions, no matter at what compensation. Restrictive and prohibitive measures have succeeded in some localities and have failed in others. This economic question, like all such problems, will probably be settled only when the people realize that they get exactly what they pay for and that a doctor who only receives fifty cents quarterly is making a pretense at rendering services which are not worth even that absurd amount.

POSTGRADUATE COURSE FOR COUNTY SOCIETIES

DR. JOHN H. BLACKBURN, DIRECTOR
BOWLING GREEN, KENTUCKY

[The Director will be glad to furnish further information and literature to any county society desiring to take up the course.]

Fifth Month—Fourth Weekly Meeting

DISEASES OF THE SCROTUM AND TESTICLES

SCROTUM

INJURIES AND WOUNDS.

CUTANEOUS AFFECTIONS.—Erythema intertrigo, eczema, pruritus, pediculosis, diagnosis and treatment of each.

TUMORS.—Epithelioma, symptoms and treatment.

TESTICLES

ANOMALIES.—(1) Of development, (a) number (excess or deficiency), (b) size (excess or deficiency); (2) of migration, (a) undescended (in or out of normal course), (b) descended (inversion).

CONTUSIONS AND WOUNDS.—Symptoms and treatment.

EPIDIDYMITIS, EPIDIDYMO-ORCHITIS, ORCHITIS: Etiology and symptoms of each.

TUBERCULAR DISEASE.—Pathology, changes in epididymis, in testicle, primary and secondary lesions. Diagnosis.

SYPHILITIC DISEASE.—Pathology. Diagnosis.

TUMORS.—(a) Carcinoma. Types, pathology, differential diagnosis. (b) Sarcoma. (c) Cystoma. (d) Enchondroma. (e) Lymphadenoma.

HYDROCELE.—Pathologic varieties. Acute, chronic. Diagnosis, treatment of each.

HYDROCELE OF THE CORD.—Pathologic and clinical varieties.

HEMATOCELE.—Pathologic and clinical varieties. Diagnosis.

VARICOCELE.—Etiology, symptoms, treatment, palliative and radical.

TUBERCULOSIS OF CORD AND VESICLES.—Diagnosis. Prognosis.

VESICULITIS.—Symptoms, treatment.

DISEASES OF THE PROSTATE

PROSTATITIS.—Acute; causes, predisposing and immediate. Treatment. Chronic, symptoms and diagnosis.

TUBERCULOSIS.—Frequency, primary and secondary, age, pathology. Diagnosis and prognosis.

ENLARGEMENT.—Pathology: Changes: (1) In glandular, (2) in fibrous; involvement of one or more lobes, effect on urethra, bladder, ureters, kidneys. Coincident pathology from senility. Symptoms: (1) Frequent micturition, (2) delay in starting, (3) dribbling, (4) retention. Effects of infection. Treatment: Hygienic, medicinal, dilatation. Catheterism, indications, dangers, technic. Operative treatment: (1) Overdilatation of sphincter, (2) prostatotomy, (3) prostatectomy, (4) cystostomy, (5) castration or vasectomy.

MONTHLY MEETING

Treatment of Cystitis.

Physiologic and Therapeutic Action of Urinary Antiseptics and Sedatives.

The Present Status of Prostatic Surgery; The Results of Prostatectomy.

Society Proceedings

COMING MEETING

Medical Society of State of New York, Albany, Jan. 26.

SOUTHERN SURGICAL AND GYNECOLOGICAL ASSOCIATION

Twenty-first Annual Session, held in St. Louis, Dec. 15-17, 1908

The President, DR. FREDERICK W. PARHAM, New Orleans, in the Chair.

The new officers elected were mentioned in THE JOURNAL, Dec. 26, 1908, page 2225.

Syphilitic Hyperplasia of Bone

DR. C. E. CALDWELL, Cincinnati: This condition is characterized by the deposition, without apparent coincident inflammatory symptoms, of a bony substance from the osteogenetic layer of the periosteum. When occurring in the long bones, particularly in the tibia, it results in overgrowth or a species of gigantism of the affected bone. Occurring in the metaphyses or epiphyseal ends of the long bones, through juxtaposition to a joint, it may be mistaken either for tuberculous epiphysitis, or, as in one case, may simulate closely in its clinical history and appearance a myeloma or giant-celled tumor of the epiphysis. In the Roentgen ray we have a satisfactory means of differential diagnosis, and we are usually rewarded with a picture which definitely classifies the condition.

The class of cases to which I refer have usually a remote and not always clearly defined history of syphilitic infection. The progress of the affection is so gradual and accompanied by such slight disturbance of the comfort of the patient that he does not usually present himself for treatment until the bony overgrowth is such as to attract his attention. Inasmuch as the patients who have come under my observation have not undergone operation, but have more or less promptly yielded to treatment with iodid of potassium in large doses, in a period varying from six weeks to three months, with local inunctions of mercurial ointment, there has been no opportunity for pathologico-histologic investigation. Inferentially, from the *x*-ray pictures, there is a formative osteitis of an extremely chronic form, which not inaptly may be compared to the chronic interstitial hyperplasia of internal viscera, and to the syphilitic hyperplasia of the coats of arteries resulting in obliterating endarteritis. It is not improbable that in this class of cases there may be nutritive changes in the periosteum which produce a condition not dissimilar to leontiasis or to Paget's disease. In one case affecting the lower end of the tibia the tumor was so circumscribed and had grown so large as to have deceived certain surgeons into the belief in its sarcomatous or myelomatous nature. In this case, a man, aged 34, in whom there were found no stigmata of syphilis, a history was elicited

of a sore which had been contracted seventeen years before, although there was no history of secondary mischief. A diagnosis of syphiloma or formative osteoperiostitis was made and confirmed by the *x*-ray. Iodid of potassium in large doses cured the patient in three months.

DISCUSSION

DR. ARTHUR DEAN BEVAN, Chicago: We should be repeatedly reminded of the fact that there are syphilitic granulomas that produce tumor-like masses of the bones which are very apt to be mistaken for a sarcoma. Esmarch discusses the general subject of sarcoma and syphilitic lesions and the effect of antispecific treatment in connection with these lesions. A man was brought to me by a good practitioner with a diagnosis of sarcoma of the thigh; the clinical picture was definite, the patient, the father of four or five children, denying absolutely any history of syphilis. When informed that amputation at the hip joint was necessary, he was willing to submit to the operation. Fortunately, before doing this extensive operation, massive doses of iodid of potassium were employed for a few months, with entire disappearance of the tumor, and then the patient confessed to a syphilitic lesion long before he was married, with the statement that he had not said so before because he was so confident that there could be no connection between that initial lesion and the present condition. How does Dr. Caldwell differentiate between an ordinary gummatous lesion, which is so common, and a hyperplasia?

DR. C. E. CALDWELL: I made this diagnosis inferentially, but it is through clinical experience of a number of cases in which I have seen this peculiar condition of new bone under the periosteum without the involvement of the overlying skin when the bone is superficial. In ordinary gummatous periostitis of the more common type there is infiltration and thickening roundabout; and there is often discoloration of the skin. The clinical history is more acute than in the cases I have described. The disease went on for a number of years before the case was referred to me for diagnosis. The object of the paper is to call attention to the fact that these slow overgrowths of bone are likely to be syphilitic when a history of former infection can be elicited. In sarcoma there is a homogeneous breaking of the *x*-ray rather than that uncertain, indefinite, irregular outline found in these syphilitic lesions. If we pay more attention to these patients and examine them all with the *x*-ray fewer errors will be made.

Myoma and Myosarcoma of Stomach

DR. JAMES E. THOMPSON, Galveston, Texas, reported one case with the following symptoms: Marked hematemesis and melena; muscular cramps (tetany); no tumor palpable. Examination of gastric juice showed free hydrochloric acid, 40; no lactic acid. A partial gastrectomy was performed successfully. The tumor was found to spring from the anterior wall of the stomach and projected into the interior. Microscopically, it was a pure myoma. Dr. Thompson reviewed the literature, and found in all 62 cases of myoma and myosarcome; 19 were operated on, and 43 were found at autopsy, or in different pathologic museums. The histories of cases are too meager to build up a symptomatology.

DISCUSSION

DR. MAURICE H. RICHARDSON, Boston: While I have not had experience of this kind in stomach surgery, still I have been unable to tell the difference between a malignant tumor of the pylorus and a chronic ulcer. In these cases we can not always have at hand experts with the microscope, with freezing apparatus, sections made, etc., to assist us, and yet we must know on the spot what the diagnosis is. If we can not make a diagnosis we do not know the possibility of these growths. There are many cases in which it is impossible for the surgeon to make an accurate diagnosis at the time, yet he must decide at the time what he is going to do, how much he can determine by the sense of touch, by the sense of sight, and by the experience he has had. Every case of the kind reported widens a man's horizon and adds to his knowledge.

DR. CHARLES H. MAYO, Rochester, Minn.: Benign tumors of the stomach are so rare in proportion to malignancy that they are seldom thought of; at the same time, there are a few of these cases in which the tumors have been found to be malignant at autopsy. I recall a case of adenoma of the stomach as large as a pear, with large pedicle, yet not eroded, and not bleeding, which was situated in the posterior wall, projecting into the stomach, and was removed by excision. I also recall three cases of muscular hypertrophy of the stomach that produced obstructive symptoms. These occurred at the pyloric end, and were similar to those that we know of as occurring in children with muscular hypertrophy, encircling the pyloric end of the stomach, producing starvation and death. These cases were in adults, and yet the condition was the same, requiring resection of the stomach as for pyloric tumors.

DR. GEORGE W. CRILE, Cleveland: I want to add a case of myoma of the stomach operated on by my associate, Dr. Lower. The case conformed to the one described by Dr. Thompson. I also want to add a case of adenomyoma in my own experience which was situated in the wall of the stomach. At the time of the operation it was supposed to be a sarcoma. The stomach wall was resected and the patient recovered.

DR. J. E. THOMPSON: I thought I was dealing with a malignant growth, and if I had only known it was a benign tumor a more simple operation would have sufficed, and I should not have removed such a large portion of the stomach.

Conclusions Based on Observations of Five Hundred Cases of Fracture of the Skull

DR. WALTER C. G. KIRCHNER, St. Louis: In treating this subject I give my impressions and conclusions based on experience and observation of several hundred cases of fracture of the skull. Linear fractures of the vault usually do not require operation unless they involve important nerves or sinuses. In depressed fractures the fragments causing depression should be elevated or removed. Experience has shown that in compound fractures, especially when there is injury to the dura or brain, drainage of the wound is usually desirable. Operation for fracture at the base is indicated when hemorrhage is extradural and when there are no signs of compression. The middle fossa is most frequently involved and drainage here can be easily instituted. The practice of examining hematomata by means of exploratory incision, when reasonable precautions are taken, is practically without danger, and often gives valuable information as an aid in diagnosis. The neurologic findings are of value in determining focal symptoms, but when complex brain disturbances exist, they may be unreliable as diagnostic aids and require special interpretation. Brain compression is a positive indication for operation, and as a rule the sooner compression is removed, the better the prognosis. At operation shock and hemorrhage are factors that should be carefully regarded, and operation should be done as speedily as possible. In doubtful cases, when it is probable that the symptoms are caused by brain compression, exploratory operations are indicated. The expectant treatment is to be advocated in those cases in which there are no symptoms of brain compression, in which the temperature and pulse remain nearly normal, and in which the reflexes are but little altered. Unconsciousness in itself is no index of the seriousness of the trouble. Operation is contraindicated in those cases in which the symptoms are the result of intrinsic destruction of brain tissue, when the temperature is high, when the pulse is rapid, and the blood pressure diminished. The importance of a longer period of rest in bed should be strongly emphasized, so that the danger of secondary complications might be avoided.

DISCUSSION

DR. JOHN D. S. DAVIS, Birmingham: I do not agree with Dr. Kirchner in regard to linear fracture. I have never seen one that sooner or later did not give trouble as the result of pressure, and I think it is always better in such cases to explore and see whether or not there is any trouble.

DR. J. SHELTON HORSLEY, Richmond, Va.: I do not see what we can accomplish by exploring a linear fracture when there

are no symptoms, and when the fracture is not compound. If there is marked compression, or if there are focal symptoms indicative of brain trouble, operation should be done at once; but in a case of simple linear fracture without compression, without focal symptoms, we will do more damage than we can do good by attempting to remove some of the bone, leaving a larger raw surface, with more adhesions, and greater likelihood of subsequent trouble.

DR. MAURICE H. RICHARDSON, Boston: I have found operations for acute epilepsy secondary to fracture of the skull so discouraging that I do not undertake them with any great hope of effecting a cure. When people have their heads smashed, more or less, I feel that we must take reasonable precautions to be sure we are not overlooking serious injuries of the skull, thinking perhaps they are trivial. I do not feel that I can add anything to the discussion except to mention the discouraging features of late results from trauma with presumably a certain amount of compression and perhaps a spicule of bone sticking through the dura mater.

DR. G. W. CRILE, Cleveland: I would suggest the use of hexamethylenamin in cases of fracture through the base of the skull, because if large enough doses of this drug be given it will be eliminated in the cerebrospinal fluid, and you may sterilize, it is claimed, wholly or partly the cerebrospinal fluid; therefore in fractures of the base of the skull this drug is of value. To accomplish this it is necessary to give about one hundred grains a day of the drug. This suggestion was made by McCallum of Baltimore. In cases of fracture of the skull I have also used a Bier bandage around the neck, and believe that it seems to be of benefit.

DR. MILES F. PORTER, Fort Wayne: Many of these secondary brain troubles can be averted by exploratory operation, such as Dr. Kirchner has advised in doubtful cases. Also by exploratory operations we can remove conditions which later on will lead to serious trouble, such as epilepsy. About 30 per cent. of children receiving cranial injuries at birth subsequently develop epilepsy, and it is probable that a much larger percentage of these injuries to the skull and brain in adults subsequently cause epilepsy. If these epilepsies are to be cured, if you will permit an Irish bull, you must cure them before they begin. After the epileptic habit is established, even though it be clearly of traumatic origin, these patients do not respond very well to surgical procedures; a large number are only cured temporarily. The lesson is this: If we expect to do good in these cases it must be done by early operation. We must seek to prevent the development of epilepsy rather than to cure it after it has once been established. I heartily favor the suggestion that in these cases, where there is doubt, this doubt may be expelled by an exploratory operation, which should be done just as we would explore, for instance, the abdominal cavity.

DR. LE GRAND GUERRY, Columbia, S. C.: The use of hexamethylenamin has been mentioned by Dr. Crile; I think it was accidentally discovered by Dr. McCallum; that is, he recovered pure formaldehyd from a biliary fistula in a patient in the hospital, and afterward the pure formaldehyd was recovered from the cerebrospinal fluid after the use of hexamethylenamin. Dr. Cushing of Baltimore last year advocated decompression in the relief of these fractures of the base of the skull. I have had some experience with this operation and am favorably disposed toward it.

DR. R. M. CUNNINGHAM, Birmingham, Ala.: I have seen 150 cases of fractures of the skull. They can be divided into four classes: First, those in which the patients are killed immediately or die within a few hours. They call for no comment. Second, those in which there are gross surgical lesions and pronounced neurologic symptoms. Third, those in which there are gross surgical lesions, with few or no neurologic symptoms. Fourth, those in which there are pronounced or slight neurologic symptoms, but no gross or surgical lesions. The first class of cases call for no comment because the patients are dead or will soon die. There should be no dispute over the second class, because when there is a lesion and symptoms operative procedure is called for. The third class, those in which there are gross pathologic lesions, and no or few neurologic symptoms, are common in fractures of the vault in which there is depression or comminution of bone, with or without symptoms; these should be operated on. Many of these cases can be operated on early without any shock or danger attending the procedure. When there is a linear fracture without depression and without symptoms, I usually determine the source of the injury. If the fracture is by direct violence, with a small implement, or was produced by a fall from a height on some obstacle, if there is the least indication of depression of the external table, and a linear fracture leading off, perhaps stellate, I operate, because there is a strong probability that the internal table is scaled off and is stuck into the dura. If it is from the vault, on a smooth surface, like the floor or the ground, or a blow with a large implement, and there is a crack in the skull without any visible depression of the external table, and without its radiation in a stellate direction, and without neurologic symptoms, I do not operate. A crack in the skull will heal with but little callus, and there is little danger of a tumor or endostosis growing from the surface of the brain. In my experience many of these patients go back to work with a crack in the skull.

DR. HORACE J. WHITACRE, Cincinnati: It is my practice, no matter how slight the injury, to keep these patients away from business and from all mental work for a long period of time. I have kept schoolboys from going to school for six months, and business men away from their business for from six months to a year after injuries to the skull, even though they were apparently well and had recovered promptly.

Fractures of the Elbow Joint

DR. ROBERT CAROTHERS, Cincinnati: I have selected three points for consideration: First, the importance of a correct diagnosis; second, current apposition and maintenance of the fragments; and third, early passive motion. A diagnosis is based on the physical signs present and confirmed by *x*-ray plates made at right angles to each other of the injured elbow. It is the careful study of the case that counts, such as the cause of the accident, the age, comparison of the injured with the uninjured elbow, and then an elucidation of any and all the signs of fracture, and especially as applied to the location under consideration. After this evidence has been obtained, with a careful study of the *x*-ray plates, one is able to arrive at a diagnosis which is not only complete but likewise scientific. Since these injuries occur with such frequency in childhood, in reading an *x*-ray plate in such a case one must have in mind the ossifying centers in the immediate neighborhood of the elbow joint, and not be misled thereby. I can not lay enough stress on the *x*-ray examination of fractured elbow joints, for a diagnosis otherwise made is a guess at the best. The most frequent fractures are of the internal or external condyle, the lower end of the humerus, epiphyseal separation, Y-shaped or T-shaped fractures, fractures of the olecranon, and head or neck of the radius. In the case of a detached external condyle, apposition by manipulation and maintenance by adhesive plaster splints with traction and a plaster-of-Paris bandage for protection, the forearm being semi-flexed and pronated, is all that is to be advised in the majority of cases. In an epiphyseal separation, fracture of the lower end of the humerus, the line of fracture from above downward, and from behind forward, and the misplaced fragment being upward and backward, also in the T-shaped and Y-shaped fractures, apposition is best effected by first extension, then traction of the fragment, and, last, extreme flexion of the forearm. Maintenance is secured by a plaster-of-Paris splint, which will insure overflexion of the forearm. In the so-called chisel fractures of the head of the radius the repair is usually with so much callus and impairment to function of the joint that it is advisable, unless for some good reason contraindicated, to remove the broken fragment. In the fractures of the neck of the radius, the best results will be obtained by making apposition which ordinarily is easy by manipulation and maintaining the same with the forearm in a semiflexed position to overcome a possible displacement of the biceps.

(To be continued)

PHILADELPHIA COUNTY MEDICAL SOCIETY

Regular Meeting, held Nov. 25, 1908

The President, DR. A. M. EATON, Philadelphia, in the Chair

SYMPOSIUM ON VACCINATION

The Rôle of the Bureau of Health in Public Vaccination

DR. ALEXANDER C. ABBOTT: When smallpox appears in a community the people are supplied with two weapons of defense: First, hospitals for the segregation of cases; second, vaccination. The former is of great convenience in lessening the number of foci in private houses and in placing patients under conditions where they can be properly cared for; but, compared to the value of vaccination in getting smallpox out of the community and preventing it from reappearing, it is nothing. There is no general compulsory vaccination law, but we have a good law which if conscientiously and discreetly administered will prevent serious outbreaks of smallpox.

The first rôle of the Bureau of Health is soberly and as a matter of course to pay particular attention to vaccination. Since July 1, 1903, there have been 324,816 persons vaccinated in the routine work of the Bureau of Health. This does not include vaccinations by physicians in hospitals, dispensaries, orphan asylums and every place where people congregate. Since Jan. 1, 1904, the Bureau of Health has paid out $19,110 for vaccine virus. We estimate roughly that it costs the city about 27 cents for a single vaccination. In the epidemic of 1903, while we had no difficulty in persuading most employers of labor to require a certificate of successful vaccination from employés, I believe that to be a measure well worth bearing in mind. We had intelligent cooperation also from the hospitals in their agreeing to require a certificate of successful vaccination from all visitors. A point which we insisted on with only partial success was that since the state favored vaccination any institution receiving state aid should see that its inmates were vaccinated. That is a point which I think can be well taken. If among all people vaccinated there had been many serious results I think it likely we would have heard of them.

I have heard of one death, with the death certificate marked with vaccination as the primary or secondary cause, I do not remember which. Investigation showed that the child had septic pneumonia when it died; we learned that the man who signed the death certificate did not believe in vaccination. I think that half a dozen cases in which the mothers have brought their children to my office represent the maximum of bad arms we have heard of. In one case which looked particularly nasty we took off a filthy rag which the child had been wearing since the vaccination; the sore had become infected and was suppurating. The child was put into the hands of a competent person and rapidly recovered. This was the trouble with practically all cases of bad arms brought to the health office. At the opening of school dozens and dozens of children present to the inspector certificates of successful vaccination signed by perfectly competent and, so far as I know, perfectly honest physicians, but the most careful examination can show no evidence of a vaccination scar. I have about 500 such certificates in my office. Inquiry showed that in the majority of cases, while the wound was drying the certificate was written and the physician never saw the child again. Another interesting phase is that of the so-called immunes from vaccination. You would not, however, find many immunes if good virus were used. I believe that some vaccinations are done so carelessly that bad results only can be expected. The vaccination should be done with surgical care and with properly prepared virus.

Smallpox Before and Since the Discovery of Vaccination

DR. JAY F. SCHAMBERG: The date of the origin of smallpox has not been definitely established. Smallpox was as prevalent among the inhabitants of European countries in the eighteenth century as measles is at the present time. The distinguished mathematician, Daniel Bernouille, calculated that not less than 15,000,000 human beings died of smallpox in twenty-five years. When these and other figures are added to the deaths due to devastating epidemics in Asia, Africa and America, the estimate of Bernouille does not appear to be overstated. Vaccination has totally changed the age period of smallpox. It is exceedingly rare for a successfully vaccinated child under 5 years of age to die of smallpox, and such death is uncommon in a child under 10 years who is successfully vaccinated. The careful records of smallpox mortality kept in Sweden and England make it possible to prove by documentary evidence that a marvelous decrease in the deaths from smallpox occurred within a short period after the introduction of vaccination. In the twenty-eight years before vaccination in Sweden, there died each year from smallpox out of each 1,000,000 of population 2,050 persons; during the forty years following vaccination, out of each 1,000,000 of population the smallpox deaths annually averaged 158. Such figures might be multiplied by reference to the records of other countries. The opponents of vaccination declare that the decrease in smallpox is due to the discontinuance of inoculation. Unfortunately for this contention, the increase in the prevalence of smallpox during the eighteenth century can not be attributed to inoculation, for were this the case then the increase should have been apparent only after the introduction of inoculation; whereas, as a matter of fact, the increased prevalence was noted before that period. In Sweden, where inoculation was never practiced to any extent, the fall in smallpox after the introduction of vaccination was as marked as in any country. It has been, furthermore, alleged by the opponents of vaccination that the decline in smallpox was the result of improvement in sanitary conditions. While it may be conceded that such improvement tends to lessen the fatality of all infectious diseases, not excluding smallpox, it is totally inadequate to explain the striking and progressive decline in the prevalence and mortality from smallpox that followed the introduction of vaccination. Again, improved sanitation has caused a reduction of the general death rate of the country of only 9 per cent. Another noteworthy fact is that the decline in the death rate from smallpox has been limited entirely to persons below the age of 15. The percentage of mortality borne by children the subjects of measles, scarlet fever, and whooping cough does not differ materially from what it was a century ago. In order to exterminate smallpox we must have not only universal vaccination, but also its logical complement, universal revaccination. The only country of importance which has for any period carried out vaccination in this manner is Germany, and of all the important countries of the globe Germany is freest from smallpox. If there were in evidence no other statistical evidence of the efficacy of vaccination as a preventive measure against smallpox, the official figures of Germany since the enactment and provision for proper enforcement of the compulsory vaccination and revaccination act in 1874 would constitute adequate and convincing testimony.

So-Called Dangers of Vaccination

DR. WILLIAM M. WELCH: My attention has been given to the vaccination process in many thousand persons without the observation of a single death. In a number of instances of alleged death from vaccination I have found that death was caused by some disease entirely independent of the vaccination or by some virulent poison introduced through carelessness. Jenner demonstrated in the most conclusive manner that vaccination was prophylactic against smallpox and unattended with danger before he ventured to publish it to the world. He wrote: "I placed it on a rock where I knew it would be immovable before I invited the public to look on it." Whenever his instructions have been carefully observed in regard to the method of vaccination, nothing but good results have followed. In spite of the fact that vaccination was shown to possess complete mastery over smallpox, there arose a band of antivaccinationists who persistently maintained that the agent had no merit whatsoever, even insisting that if the practice were continued it would eventually transform man into a hideous monster presenting some of the characteristics of both the human being and the bovine animal. Of all the supporters of Jenner, Waterhouse was the most worthy, but, despite his great care, vaccination not infrequently fell into the hands of practitioners who not only disregarded his precautions, but violated every rule laid down

by Jenner, and vaccination was, therefore, threatened for a time with serious discredit.

Erysipelas is an infrequent complication in vaccinia. When pure virus is used, erysipelas is not liable to occur, except as the result of secondary infection. The alleged cases of leprosy are open to serious doubt. Whether or not it is possible to transmit tuberculosis through the agency of the bovine lymph is not yet determined. The danger, however, is not great, and may be obviated by having the vaccine virus taken from calves. Tetanus following vaccination is said to be unknown in France, Germany and other countries of continental Europe. Inquiry into a number of alleged cases in this country showed that the poison was not introduced simultaneously with the vaccination virus, but subsequently. I know of no case of tetanus after vaccination in which the tetanic symptoms appeared earlier than two weeks subsequent to vaccination. With the safeguards which at the present time surround the process of vaccination I feel perfectly safe in saying that if the individual be in normal condition, the operation conducted with surgical cleanliness and if the wound be guarded until the scab forms and falls off naturally, no dangerous consequences need be feared.

The Legal Aspects of Vaccination.

MR. HAMPTON L. CARSON: I shall confine myself strictly to the judicial aspects of the matter, leaving entirely out of view considerations of legislative discretion. The question is whether a statute of compulsory vaccination is within the constitutional power of the legislature, and whether it is an invasion of the personal liberty of the citizen. In Osler's "Practice of Medicine" it is stated substantially that a large unvaccinated population had grown up in Montreal in consequence of the prejudice against vaccination. One Pullman car conductor suffering from smallpox came from Chicago to Montreal, Feb. 28, 1885. Within the next ten months several thousand cases of smallpox occurred, and 3,184 persons died out of a population of 185,000; the number of cases of deformity, blindness, etc., resulting can not be estimated. A correspondent of mine asked whether it was not an invasion of the personal liberty of all the citizens of Montreal when one man was allowed to make thousands sick and deformed and kill 3,184 people simply because that one person was not vaccinated. The answer is plain. The Supreme Court of Pennsylvania has declared that compulsory vaccination "is not only justifiable, but a wise and beneficient exertion of the police power over the public health." Should a law be passed requiring general vaccination, no question can be successfully raised in the courts to challenge the authority of the statute.

Discussion on Smallpox.

DR. W. W. KEEN: In the case of the Pullman car conductor in Montreal, cited by Mr. Carson, I have no doubt that, when he developed smallpox, he was seized and incarcerated in a hospital until he was well or dead, and the question arises, Which of the two is the greater invasion of personal liberty, the infliction of the minor wound of vaccination or the seizure of a patient and the putting him into a hospital? The experience of the United States in its insular possessions illustrates graphically the value of vaccination. After the Americans took possession of Porto Rico, during the epidemic of smallpox, the government vaccinated over 800,000 persons, and in four months smallpox was abolished from the island. This was not due to a change in sanitation, but solely the result of vaccination. In the last annual report of the Chief of the Sanitary Department in the Philippines, the statement is made that in seven provinces of the islands there had been for a number of years an annual number of deaths of 6,000 from smallpox. That would mean 25,000 or 30,000 cases in all. In twelve months following the institution of vaccination in those seven districts there was not one death from the disease as against 6,000. Can there be a more magnificent illustration of the value of vaccination?

DR. B. FRANKLIN ROYER: The fear of vaccination because of its untoward action is largely the result of vicious literature. I have never seen a death from vaccination even when the patient was already carrying the load of a serious disease.

DR. M. CLAYTON THRUSH: At the recent meeting of the antivaccinationists in this city I took down verbatim some statements used to seduce the people to accept their views. A prominent Philadelphian, a cultured literary man, said that the only people who could take smallpox were those whose bodies were filthy. Other statements made were that people died from vaccination because they were inoculated with poison; if men would only think for themselves they could not help condemning vaccination, for a race of real men and women could not exist so long as poison was put into their veins. The lower birth rate in France was stated to be due to vaccination. The statement was made that the only thing that saved this country was immigration, the unvaccinated immigrant keeping up the birth rate. Boards of health were termed "boards of ill health." Vaccination was said to be advocated by medical men for what they got out of it. Lantern slides were exhibited showing cases of tuberculosis, syphilis and deformities of all kinds, and it was said that all were the direct result of vaccination.

DR. JAY F. SCHAMBERG: If there is one sound argument that antivaccinationists might urge, it is that vaccination is a procedure not absolutely unattended with risk; but neither is any other human procedure. The wound of vaccination, if maltreated, produces a bad result as would any other wound under bad treatment. I believe that most of the antivaccinationists are perfectly sincere in their convictions, but they close their minds to facts and logic, and I am not sure that they would be convinced by an actual demonstration of conditions. The great fault with which we physicians may be accused is that we have remained silent while a small but determined band of antivaccinationists spread literature among the people. Sensible people will accept the voice of the medical profession. Should there be legislative enactment in favor of the antivaccinationists, it is an absolute certainty that within two or four years laws would be enacted with increased vigor, much more widespread and positive in the requirement of vaccination. The first epidemic of smallpox would lead to this. We know that we can trust in the good sense of the American people.

DR. WILLIAM M. WELCH: During the epidemic of smallpox in our city from 1901 to 1904, of the more than 4,000 smallpox patients admitted to the Municipal Hospital, there was not a single patient who had been successfully vaccinated within five years and only very few who had been successfully vaccinated within ten years. Among the many students who came to the Municipal Hospital to study smallpox one was unvaccinated. Within two weeks of the time he came to study the disease he entered as a smallpox patient. A large number of infants were born in the hospital of mothers suffering from a mild form of varioloid. They were vaccinated on the very day they were born and the vaccination took while they were nursing from the mother's breast; yet they were perfectly protected throughout. Another instance was that of a family in which two of the children had been vaccinated on reaching the school age. The parents were antivaccinationists, and with their four other children were unvaccinated. When the smallpox broke out they were stricken and entered the hospital. The children who had been vaccinated came to the hospital with their parents. They slept with the other children, ate in the same room and had perfect health throughout the several weeks in the institution. In the after-care of the vaccination wound I do not like the use of the shield. The wound should be protected from the woolen underclothing by a perfectly clean piece of muslin, but the clothing must be loose so that the vaccine vesicle will not be disturbed. A wire screen is used sometimes with advantage to keep the clothing from the wound.

A resolution proposed by Dr. John B. Roberts was passed, to the effect that the committee of the state society on vaccination be requested to arrange for a conference between the committee and representatives of the transportation and manufacturing companies of Pennsylvania, having for its end a combined effort to prevent any change in the vaccination laws which would lessen the security against epidemics of smallpox.

Medicolegal

New Doctrine as to Liability of Charitable Corporations for Acts of Agents or Servants, with Classification of Typical Cases

The Supreme Court of New York, Appellate Division, Second Department, says that Kellogg vs. Church Charity Foundation of Long Island was an action against a charitable hospital corporation for damages for injuries to the plaintiff by being run into in the street by an ambulance of the defendant by the negligence of the driver. There was a dismissal of the case on the ground that charitable corporations are not liable for the negligence of their agents or servants, i. e., that the rule respondeat superior (the superior must answer) does not apply to such corporations. The judgment should be reversed.

The question presented has been dismissed in a large number of cases in this country. The opinions and decisions are not only conflicting, but those which reach the same result do not agree on any rule of exemption from lability, and many of them rest on stated reasons or grounds which may well be challenged as fallacious. This court is free from the constraint of authority, for the question has not been settled in New York State, if, indeed, in any state. There seem to be no such cases in England.

For a correct understanding it is necessary to classify the cases. When that is done the limits of the question will be perceived, and it will also appear that its discussion in most of the cases was irrelevant.

1. There are a considerable number of them, such as Corbett vs. St. Vincent's Industrial School, 177 N. Y. 16, and Benton vs. Boston City Hospital, 140 Mass. 13, which serve as examples of the whole class, in which non-liability rests on the ground that the charitable institution was acting as an agency of sovereignty, and as such shared with it its immunity from being sued, as the familiar rule is. These decisions are promiscuously cited as applicable or as make-weights in cases where such agency did not exist, but obviously have to be left out of consideration in so far as the point actually decided in them is concerned; and the expressions in the opinions outside of that are not binding.

2. In the great bulk of the cases the negligence sued for was that of physicians or surgeons, or of nurses and similar employés, to patients in such charitable institutions. It may well seem strange that lack of liability in such cases should be so invariably put on the ground that the defendant for being a charitable institution was not subject to the rule respondeat superior, which applies to the relation of master and servant in respect of torts (wrongful acts) to third persons by the servant; for such relation of master and servant does not exist as to third persons in the employment of physicians and surgeons, and the like (unless, to be sure, by contract). They are not servants, but in an independent employment; and with them must be classed, on the same principle, it would seem, their assistants, nurses and the like, in the things in which they necessarily act under their control and direction, instead of that of the employer.

3. We are now come, by process of elimination, to a precise test of whether, and, if so, in what cases, charitable institutions are exempt from the general rule respondeat superior in respect of the torts of their servants.

(a) In many of the cases much is made of the fact that such institutions derive no profit or benefit, on the question of whether such rule applies, or, indeed, whether they can be held liable for any torts. But that exemption from liability does not arise from that fact is manifest from the undoubted liability of other similar institutions which derive no profit or benefit.

(b) In many if not most of the cases a ground for the non-reliability for the torts (wrongful acts) of agents or servants of charitable institutions is that to pay damages for such torts would be a diversion of their funds from the trust purposes for which they are donated by the charitable, and thus a contravention of the trust, and that as such institutions have no other funds it would be futile to allow judgments to be taken against them in such cases. But the opinions of the judges in these same cases almost invariably except cases where the agent or servant was incompetent and there was negligence in his selection; failing to take note that it would be as much a diversion of the trust funds to pay damages for the tort of negligence in selection as for any other tort. If the rule exist it must necessarily apply to all torts and in all cases. The only support for the argument that it does exist is found in the remarks of judges in certain rather old English cases, which were repudiated in later cases, and never had a direct application to actions of tort against charitable corporations such as are now common. The position of such a corporation in respect of its torts would seem to be the same as that of an individual carrying on similar charitable work with donated funds or with his own funds. I (the writer of this opinion) do not understand that if my servant, sent out by me on an errand of mercy or charity, negligently runs over one in the street, I am not liable for his act.

4. In what cases, then, is such a person or corporation freed from the rule of respondeat superior? That rule exists only where the strict relation of master and servant exists out of which such rule grows, as we have already seen; it does not grow out of every case of one employing another. We must therefore come down to employés in respect of whom such relation of master and servant can exist, for it is useless to talk of the said rule in respect of employés who are not such servants—who are above their grade of service—as is the case of physicians and surgeons, and the like. This brings the question down to the ordinary run of servants, who are subject to the direction of the master at any moment in the manner and way of doing the work assigned to them, in general and in detail.

If a charitable institution is to be freed from the rule respondeat superior a ground therefor must be found in law. If, then, in order to find a ground, we again resort to classification of the cases that have come into the courts, or that may arise, and separate torts of such servants against beneficiaries or patients of the charitable trust or institution, from torts against outsiders, a ground for such exemption may be perceived in respect of the former, but not of the latter.

The law may imply an intention on the part of the donors of the charitable funds that such funds shall be used for the charitable purpose only, and then imply an acquiescence in this intention by all persons who accept the benefits of the charity, and in that way spell out a waiver by such persons of any responsibility of the institution for the negligence or torts of its servants. If the courts want to exempt such institutions, this may be a tenable, though some may think a rather ingenious or far-fetched ground on which to do it. But no such acquiescence or waiver can be attributed to an outsider; to a person run over in the highway by the ambulance of such an institution by the negligence of its driver, for instance.

5. It is probably manifest enough at this stage that there are tort cases against such institutions which do not come within the foregoing classifications and discussion at all. Cases where the duty owed is one specifically cast on the defendant by law, and therefore incapable of being evaded or escaped by being delegated to any servant. Liability in such cases does not rest on the rule respondeat superior, but on the narrower one that the duty is one for the defendant to perform itself, and into which the question of the negligence of servants does not enter. Of course if such institutions were to be held not liable for their torts or neglects in respect of duties which can not be delegated to servants, they would be held not liable for any torts of servants also for the reason of exemption, whatever it might be; but there is not any disposition to exonerate them from the former liability. For instance, the cases generally admit that they would be liable for negligence in the non-delegable duty of selecting competent servants or employés, of whatever grade or kind, as we have seen.

Current Medical Literature

Medical Record, New York

December 19

1 *Prognosis and Treatment of Deep Lesions of the Eye, Associated with Gout, Especially Secondary Acute Glaucoma. C. S. Bull, New York.
2 Local Anesthesia in Major Surgery, with Especial Reference to Abdominal Work. W. S. Schley, New York.
3 *Tuberculosis in Hospitals for the Insane. R. H. Hutchings, Ogdensburg, N. Y.
4 Etiologic Indications in the Treatment of Pneumonia. H. B. Knapp, Wiconisco, Pa.
5 Diagnostic Points in the Recognition of Perforated Gastric and Duodenal Ulcers. B. T. Tilton, New York.
6 Hospital Notes Taken During a Visit to Scandinavia. J. B. Boucher, Hartford, Conn.
7 Lymph Propulsion and Exchange. G. N. Jack, Buffalo.
8 New Method for Administering Ether as an Anesthetic. A. L. Soresi, New York.

1. **Eye Lesions and Gout.**—Bull says that while the association of grave lesions of the retina and chorioid are by no means of common occurrence, they seem to be increasing in frequency and are very destructive of vision. Such lesions particularly call for the cooperation of the family physician and the ophthalmologist. The patients are markedly gouty, past middle age, and leaders of an ultrastrenuous life. The intraocular inflammation was never simultaneous with an acute arthritic attack but an intestinal attack always followed, in Bull's cases, and the urine showed marked excess of uric acid and high indican percentage, denoting faulty metabolism of fermentative intestinal origin. The uric acid acts not only as a toxic agent, but as a mechanical irritant. All the patients showed the well-known cardiovascular changes of chronic lithemia. Bull discusses the pathologic conditions, chief of which is increased blood pressure, which causes intraocular tension and consequent hemorrhages into the eye. The hemorrhages occur early in the disease, and are less likely to happen later when the vessels have become thickened by the disease. The great danger is the development of acute glaucoma, which is especially prone to occur in the hypermetropic or very astigmatic eye. The treatment and management of these patients varies with age, general condition, nature of lesion, and severity of type. Habits of life must be regulated—as much quiet as possible, moderation in eating and drinking, and curtailment of meat are necessary. Systematic exercise in the open air is called for. The moderate use of alcohol, if it is well diluted, need not be interdicted, for while alcohol dilates the peripheral blood vessels, it does not appreciably increase the blood pressure as tobacco does, which last must therefore be forbidden or reduced. Water should be taken frequently between meals. To reduce blood pressure, sodium nitrite, combined with a heart tonic, is useful. If the blood pressure is very high vasodilators must be administered slowly, and their effects on blood pressure, pulse rate, and sensations of the patient, carefully noted. Bull regards the last point as of even greater importance than the other two. Locally, pilocarpin in 0.5 per cent. or 1 per cent. solution should be used to draw the iris from the anterior chamber and to lower intraocular tension. Smoked glasses, not darker than tint No. 3, should be used. An iridectomy in an acutely inflamed eye requires general anesthesia, which in the general condition of the patient increases the danger. In 5 cases reported, iridectomy was avoided by the following methods: Under a strong solution of cocain a paracentesis of the cornea was done and the aqueous humor allowed to flow out, drop by drop, from the anterior chamber, thus lowering the tension very slowly and avoiding danger of intraocular hemorrhage. Two leeches were applied to the temple until they dropped. A solution of eserin sulphate, one grain, and of pilocarpin, four grains, was instilled every hour, until, under the combined influence of the paracentesis and the use of meiotics, the eye softened and the pain grew less. The eserin and pilocarpin are applied less frequently as the tension and pain subside, and hot applications to the eye are used, 20 drops of the fluid extract of jaborandi also being given internally three times a day.

3. Abstracted in THE JOURNAL, Nov. 28, 1908, p. 1897.

New York Medical Journal

December 19

9 *Treatment of Biliary Disease as Determined at Operation. H. Lilienthal, New York.
10 The Mistletoe. J. Knott, Dublin, Ireland.
11 Is Not the Tubercle Bacillus the Cause of Cancer? T. G. McConkey, San Francisco.
12 *The Anamnesis of Subjects of Exophthalmic Goiter. E. J. G. Beardsley, Philadelphia.
13 Hemorrhages Into the Vitreous Body in the Adolescent. J. A. Gehrung, New York.
14 Lumbar Puncture in Otology. S. Oppenheimer, New York.
15 Scarlatinal Epidemic from Infected Milk Bottles. H. B. Wood, Philadelphia.
16 Effect of Mammalian Pituitary on Tetany After Parathyreoidectomy and on the Pupil. I. Ott and J. C. Scott, Easton, Pa.

9. **Biliary Disease.**—Lilienthal says that the surprises of abdominal section occur in one's early days of surgery. Later, the surgeon learns not to be surprised at any condition, however interesting or unusual, within the peritoneal cavity. A quiet and safe uncertainty replaces the beautiful confidence and accuracy of youth, and cool and instant acceptance of conditions the unexpected shock of an overturned diagnosis. It is better not to operate unless there is full permission to do everything necessary for the welfare of the patient. Even a normal gall bladder, in the absence of gastric, duodenal, or renal disease, had better be removed if the symptoms are grave enough to warrant operation, and exploration results otherwise negatively. Pericholecystitis with suppuration may render unwise the necessary dissection for the removal of the gall bladder, even though its walls are thickened and other conditions for cholecystectomy are present. Temporary relief with later radical intervention is the wiser course. While, in the presence of icterus, the operation should not be stopped until the bile flows, the mere appearance of bile may not mean that we have done all that should be done. It may be necessary here, however, to be satisfied with palliative measures, performing a radical operation later. When, however, there is a distended gall bladder with sepsis, with or without icterus, the gall bladder may be emptied or removed and the entire operation concluded without show of bile, provided the patient is too weak to permit of persistent dissection. In the aged and extremely feeble, as little should be done as will suffice to overcome the present emergency. Never, except in the presence of collapse, should the abdomen be closed without examining the pylorus and pancreas. As to technic, Lilienthal advises the use of but little gauze packing, even of the temporary variety. In disease of the common duct the organ is more easily reached and manipulated when the gall bladder has been removed and the cystic duct drawn up by traction sutures. Finally, he advises leaving the traction sutures in place as a precaution against hemorrhage.

12. Abstracted in THE JOURNAL, October 31, 1908, p. 1543.

Boston Medical and Surgical Journal

December 10

17 *Subcutaneous, Cutaneous and Conjunctival Use of Tuberculin in Diagnosis. Technic, Reliability. Results of Animal Experimentation. F. T. Lord, Boston.
18 *Transmission and Progress of Tuberculosis in Children Through Family Association. C. Floyd and H. I. Bowditch, Boston.
19 Chronic Intestinal Catarrh (to be continued). L. C. Miller, Worcester, Mass.
20 *Certain Evil Tendencies in Medicine and Surgery (concluded). M. H. Richardson, Boston.
21 *Hygienic Adjustable Bath Douche Hammock. G. L. Hagenburger.

December 17

22 Difficulties, Professional and Social, of the Early Recognition of Tuberculosis, and Suggestions as to the Remedy. E. O. Otis, Boston.
23 *Medical Inspection of Schools from the Standpoint of the Medical Inspector. J. T. Sullivan, T. J. Murphy and M. J. Cronin, Boston.
24 Epilepsy (to be continued). E. Flood, Boston.
25 Shall the Tuberculous Patient Be Treated in the Home Climate or Sent to Some Region with a More Equitable Climate, Where More Hours Can Be Spent in the Open Air with Less Discomfort? I. W. Brewers, Boston.
26 *The New Silver Salts as Compared with Silver Nitrate in Treatment of Ophthalmia of New-born Children. H. Derby, Boston.
27 Chronic Intestinal Catarrh (concluded). L. C. Miller, Worcester, Mass.

17. **Tuberculin.**—Lord's comparative investigation of the subcutaneous, cutaneous, and ocular tests with tuberculin, including the results of animal experimentation, lead him to conclude that reactions with any one of the three tests, when

properly performed, indicate tuberculosis somewhere in the body. It may not be where the clinical data lead us to suspect it, and reactions may occur in the presence of latent, inactive as well as active, foci. This must be constantly in mind in applying the results of the test to individual cases. In patients suspected of tuberculosis, a positive test is only one more factor to be considered in establishing the diagnosis, while a negative test is of much greater value and goes far toward disproving the tuberculous character of the disease in question. Of the three tests, von Pirquet's cutaneous method appears to be harmless and reliable. It is probably more delicate than the conjunctival and subcutaneous tests and hence more often responds to latent, inactive and unimportant foci. So far as can be judged, there need be no hesitation in its application.

18. **Transmission of Tuberculosis in Children.**—Floyd and Bowditch discuss the influences favoring infection in the child, modes of infection, incidence, other factors influencing infection, types of disease, symptoms and signs, and diagnosis and treatment. In regard to prophylaxis they consider as important for the protection of children, the following measures:

1. Early notification of all births.
2. Better inspection and control of the cities' milk supply.
3. Systematic school inspection.
4. Housing reform.
5. Segregation of advanced cases.
6. Required notification of the disease.
7. Provision for the care of pulmonary tuberculosis in children.
8. Education of all school children on matters of general hygiene. Nearly all these measures are being enforced in Massachusetts and, as the forces of sanitation and education advance, the solution of the problem of tuberculosis is nearer.

20. **Evil Tendencies in Medicine and Surgery.**—Richardson concludes his article and suggests as a remedy thorough and persistent preparation for the practice of surgery, 1, by careful preparatory study; 2, by abundant clinical experience; 3, by the cultivation of a calm, judicial temperament and the accurate weighing of evidence; 4, by the exercise on every possible occasion of "control" over diagnosis; 5, by the determination always to consider both sides of a question; and 6, by assiduous preparation for the mechanical and technical steps of operative procedure.

21. **Bath Douche Hammock.**—Hagenburger has satisfied himself by experimenting with litmus paper, gauze, etc., placed in the vagina, that in a douche administered in the ordinary position, the fluid does not remain long enough to remove foreign substances and vaginal secretions, or to confer the real benefit of hot water (plain or medicated). He has therefore invented a hammock which can be attached to any bathtub enabling the patient to lie with the hips elevated so that a douche can be effectively administered, the vagina being made to act as a reservoir, and all soiling and discomfort of clothing or bedding avoided. It can also be used for high rectal enemata.

23. **Medical Inspection of Schools.**—Sullivan, Murphy, and Cronin describe the history of medical inspection of school children, which was first inaugurated in this country, in Boston, in 1894, the primary object being the detection of communicable diseases. They discuss the present working, and to remedy the inefficiency of the present system, make the following recommendations:

1. That the whole system of medical inspection, including physicians and nurses, be placed under the control of the board of health.
2. That a chief medical inspector be appointed, with deputies, if necessary, to have full authority over all, his function being to direct and control the work of the district inspectors and to see that each performs the duties required; also, through a supervising nurse, to direct the work of the nurses.
3. That the medical inspectors' powers be definitely determined and specifically set forth, and that a proper compensation be given.
4. That the nurse must be subordinate to the district medical inspectors and work only under their direction.
5. That a card system of records be devised, to be filled out by both physicians and nurses, one set to be kept at the schools and another set at the office of the chief medical inspector.
6. That the board of health and the school committee cooperate in bringing about such needed reforms.

The authors feel confident that a system carefully prepared along these lines would prove ideal.

26. **New Silver Salts.**—Derby believes that the good results obtained at the Massachusetts Eye and Ear Infirmary, where it was recently stated that silver nitrate had been replaced by the newer salts, are due to the systematic and thorough cleansing of the eye, rather than to the remedies. As a result of experiments, his own faith in silver nitrate is unshaken, and he believes that it is the only agent that should be trusted in cases outside a hospital.

Lancet-Clinic, Cincinnati

December 12

28 Disturbances of the Stomach in Pulmonary Phthisis. F. L. Rattermann, Cincinnati.
29 *Incidence of Gall-Bladder Trouble and Gastric Ulcer. Differential Diagnosis, with Report of Cases. J. A. Lichty, Pittsburg.
30 *Recent Developments in Psychiatry. R. Reed, Cincinnati.

29. Abstracted in THE JOURNAL, Nov. 21, 1908, p. 1805.

30. **Psychiatry.**—Reed summarizes the history of the development of psychiatry and believes that, as in the case of infectious diseases, the best part of its future lies in the realm of preventive medicine. He suggests: first, an improvement in our public school system, greater individualization. "We have plenty of common schools for common children; why can not we have in every city uncommon schools for uncommon children?" Sane instruction as to temperance in alcoholic stimulants should replace the exaggerated statements of many school physiologies, which by receiving the lie from the children's own personal observation in their own homes lead to a reaction of sentiment. Second, the profession should make common cause with the propaganda against venereal diseases. Third, the author regards the spreading of habits of scientific thought and the extreme commercialism of everything modern, by their narrowing of the field for frank and innocent expression of emotion, as fruitful causes of insanity. The repression of emotions and natural instincts results in a source of "mental autointoxication," while their temperate expression favors a "psychic catharsis"; hence mental cults and other things tending to produce introspection are fruitful causes of insanity. He pleads for the establishment in all large cities of a hospital and clinic for the care of the acutely insane and those suffering from psychoses in process of development.

Medical Fortnightly, St. Louis

December 10

31 The Tolling Children. B. Holmes, Chicago.
32 *Fused Kidney (Horseshoe Kidney). B. Robinson, Chicago.
33 *Treatment of Eczema. R. L. Sutton, Kansas City, Mo.

32. Abstracted in the Society Proceedings in THE JOURNAL, June 6, 1908, p. 1931, and published in the *Illinois Medical Journal*, December, 1908.

33. Published in *Boston Medical and Surgical Journal*, Sept. 3, 1908.

Virginia Medical Semi-Monthly, Richmond

December 11

34 *Some Insect-Borne Diseases. G. L. Collins, Fort Monroe, Va.
35 *Sterilization of Habitual Criminals. C. V. Carrington, Richmond, Va.
36 Causes and Treatment of Frequent Micturition and Dysuria. C. S. Venable, San Antonio, Texas.
37 *The Minin Light. M. W. Peyser, Richmond, Va.
38 *Physiologic Action of Electrical Currents—Brief for Their Intelligent Use in Therapeutics. W. H. Wallace, Brooklyn.
39 *Value of the *X*-Rays in Chest Diagnosis. A. L. Gray, Richmond, Va.
40 The *X*-Ray in Treatment of Skin Diseases. T. W. Murrell, Richmond, Va.

34, 37, 38, 39. Abstracted in THE JOURNAL, Nov. 7, 1908, pp. 1624, 1625.

35. **Sterilization of Criminals.**—Carrington urges the sterilization of habitual criminals, and reports two cases so treated by him in the Virginia State Penitentiary. The first was a colored man, sentenced to a long term for a particularly brutal murder. He was transferred to the Colored Insane Asylum, Petersburg, where he killed a fellow inmate and nearly killed an attendant. He was bandied to and fro between the asylum and the penitentiary, and was finally sterilized. He was very wild, strong and cunning, and a determined masturbator. To-day, six years after sterilization, "he is a slick, fat, docile prisoner, a trusty about the yard—cured by sterilization." The second case was that of a young degenerate, "a notoriously lusty, beastful sodomist and mas-

turbator," who is now a docile model prisoner. Carrington's method is to make a slight nick through the skin of the scrotum, near the pubis, and with a curved needle to take up the vas deferens and vessels and tie them all off. One catgut stitch closes the skin wound and a collodion dressing completes the operation.

Northwestern Lancet, Minneapolis

December 1

41 Surgical Aspects of Stomach and Duodenum. A. J. Oschner, Chicago.
42 *Gastric Ulcer. F. E. Walker, Hot Springs, S. Dak.
43 Early Treatment of Certain Injuries to the Eye. J. M. Robinson, Duluth, Minn.
44 Congenital Cyanosis, or "Blue Baby." O. A. Oredson, Duluth, Minn.

42. **Gastric Ulcer.**—Walker's experience during the past three years, in comparison with his previous operative experience and observation of that of others, leads him to conclude that better results are obtainable through absolute cell rest, rectal drainage, and dietetics, massage, baths and limited drug administration than from operation. Save in a few of the greatly aggravated cases of hemorrhage and those due to perforation, the treatment he now uses is as follows:

1. Rest. The patient is put to bed for from ten to twenty days. All food and drink, except sterilized water, are entirely withheld during this period. After the enforced fast period, the patient is given hard dry toast, well salted and thoroughly masticated, red beef, only the juice being swallowed, milk, soft eggs, custards and various broths. The diet is gradually increased, and at the same time the nutrient enemata are gradually withdrawn.

2. Drainage. As soon as the patient is placed in bed, calomel and sodium bicarbonate are given, gr. 1/40 (.0015) for 40 doses at intervals of 15 minutes. Every four hours, one dram of a saline laxative is administered in as much water as the patient can take, and is continued until the last dose of calomel is given. Twelve hours after the first dose of calomel the bowels are flushed with a large high normal saline enema, and this colon flushing is used every morning before any food is introduced into the rectum. Sixteen grams of castor oil are given the evening of the second day. No more cathartic is given per os.

3. Diet. Stomach diet after the enforced starvation has already been noted. Rectal diet:

	Gms.	
First day:		
Beef tea (strong)	128	2 oz.
Hydrochloric acid	60	10 m
Glycerite pepsin	8	ʒii
Second day:		
Milk, peptonized	96	ʒiiiss
Claret	16	ʒss
Two eggs.		
Third day:		
Malted milk	96	ʒiiiss
Cream peptonized	32	ʒi

These enemata are given in rotation.

Strychnin, tincture of opium, spiritus frumenti, or other medicine is easily incorporated, as the condition from day to day requires. The method employed is to give the enemata through a No. 17 colon tube, inserted about six inches, at a very low pressure and occupying from 15 to 20 minutes. The enemata are given four times daily. Every morning the colon is flushed with a large enema of normal saline solution. Salt water sponge baths, at a temperature of 70 to 90 degrees are given night and morning, followed by gentle massage with oil. Every other day a thorough alcohol massage is administered. The teeth are thoroughly brushed several times daily, and the mouth is frequently washed with some mild antiseptic solution. Pain is controlled by packs, sinapisms, opium per rectum, or morphin hypodermically. Internally bismuth, milk of magnesia, lithium citrate, etc., are given by the mouth as required during the time in bed. Hemorrhage is treated by morphin and ice packs. Absolute mental and physical rest is imperative.

Philippine Journal of Science, Manila

September

45 *Health Conditions in the Philippines. W. S. Washburn, Manila.
46 *Prevention of Tropical Abscess of the Liver by Early Diagnosis and Treatment of the Presuppurative Stage of Amebic Hepatitis. L. Rogers, Calcutta, India.
47 *Filariasis and Elephantiasis in Southern Luzon. J. M. Phalen and H. J. Nichols, U. S. Army.
48 Distribution of *Filaria Nocturna* in the Philippine Islands. J. M. Phalen and H. J. Nichols, U. S. Army.
49 Palliative Treatment of Elephantiasis. A. Castellani, Colombo, Ceylon.
50 Further Filtration Experiments with Virus of Cattle Plague. E. H. Ruediger, Manila.
51 *Cases with Unusual Symptoms Caused by Contact with Some Unknown Variety of Jellyfish (Scyphozoa). E. H. H. Old, U. S. Navy.
52 *A Mosquito Which Breeds in Salt and Fresh Water. C. S. Banks, Manila.
53 Case of Infantile Beriberi with Autopsy Report. J. Albert, Manila.

45. **Health in the Philippines.**—Washburn protests against the "misleading articles" on the unhealthfulness of the Philippines, published by Dr. L. H. Fales, which appear to find their own refutation in the greatly reduced mortality rates. He considers the health of the 800 American teachers a fair indication of the general health of English-speaking civilians in the Philippines, and quotes the director of education as follows: "The statistics for the past year show an average of but six days' illness for each American teacher in the service. The general health of the force is excellent." With few exceptions the statistics of each succeeding year show a steady decrease throughout the islands of the inroads made by dangerous communicable diseases, of which tuberculosis, here as elsewhere, takes front rank. There appears to be greater abatement among civilians than among soldiers, of diseases due to intestinal parasites. Bubonic plague has disappeared from the islands, no cases having been reported for nearly two years. Since the completion of vaccination not a single death from smallpox has been reported in several provinces, where formerly thousands died annually. Out of 3,500,000 persons vaccinated, not one case of loss of life or limb and not one of serious infection has been reported. The working out of the leprosy problem has reached the stage, in the establishment of a leper colony, practically of assured final and complete solution. Contrary to the usual opinion, statistics seem to show a difference in health in favor of the white race as compared with the darker races. He publishes the simple health rules issued by the board of health on cards for general distribution, and refers to the great sanitary improvements contemplated, or under way, the establishment of hospitals and other institutions, etc., as pointing hopefully to the future sanitary conditions of the islands.

46. **Tropical Abscess of the Liver.**—An essentially similar paper by Rogers was published in the *Medical Press and Circular*, London, Oct. 28, 1908, and was abstracted in THE JOURNAL, Nov. 28, 1908, p. 1907.

47. **Elephantiasis.**—An essentially similar paper by Castellani appeared in the *British Medical Journal* Oct. 31, 1908.

51. **Jellyfish Stinging.**—Old reports nine cases, with one death, showing a regular symptom-complex following on the sting of a jellyfish. The complex included marked hysterical symptoms, with irritation of the mucous membrane of the nose, mouth, throat and eyes, incessant cough, restlessness, pain and nausea. Old believes that there is some absorbable substance present in the secretion of the fish, which is of a variety unknown to him. He thinks that some of the drownings may be explained in this way: Should the subject be far from shore or boat when stung, the sudden hysterical and depressant symptoms might overpower him, rendering him unable to reach his goal. In treatment Old uses alkaline solutions.

52. **A Salt Water Mosquito.**—Banks describes the *Myzomyia ludlowii* (Theob.), which in the Philippines breeds in both salt and fresh water. Altitude up to 1,500 meters has no appreciable effect on its development. There appears strong proof of its rôle as a transmitter of estivoautumnal malaria.

American Journal of Obstetrics, York, Pa.

November

54 *Solving the Problem of Obstetrics. E. G. Zinke, Cincinnati, Ohio.
55 *Arteriosclerosis of the Uterus. C. M. Rees, Charleston, S. C.
56 *Hysteria as the Surgeon Sees It. A. M. Vance, Louisville, Ky.
57 *Comparative Merits of Abdominal Celiotomy and Colpotomy in Treatment of Intrapelvic Abscess. W. S. Smith.

58 *Mobility of the Patient After Laparotomy. W. B. Chase, Brooklyn.
59 *Ectopic Gestation with Viable Child; Report of Three Cases. X. O. Werden, Pittsburg, Pa.
60 *Extrauterine Pregnancy with Report of Cases. H. E. Hayd, Buffalo.
61 *Ectopic Gestation. C. L. Bonifield, Cincinnati.
62 *Acute Pancreatitis. L. Frank, Louisville, Ky.
63 *Abscess of Gaertner's Canal. M. A. Tate, Cincinnati, Ohio.
64 *Present Status of Cesarean Section. C. C. Frederick, Buffalo.
65 *Development of the Human Ovum During the First Eight Weeks of Pregnancy. H. Schwarz, St. Louis.
66 *Intraligamentous Fibroids. J. F. Erdmann, New York.
67 *Uterine Fibromata Complicating Pregnancy. W. J. Gillette, Toledo, Ohio.
68 Myoma of the Cervix Uteri. F. Reder, St. Louis.
69 *Subdiaphragmatic Abscess. J. W. Keefe, Providence, R. I.
70 *Fevers of Intestinal Origin in Children. E. H. Bartley, Brooklyn.

54, 61 to 67, 69. Abstracted in THE JOURNAL, Oct. 24, 1908, pp. 1456, 1457, 1458.

55. Abstracted in THE JOURNAL, Oct. 3, 1908, p. 1174.

56 to 60. Abstracted in THE JOURNAL, Oct. 17, 1908, pp. 1354, 1355.

70. **Intestinal Fevers in Children.**—Bartley says, that bacterial infection is the cause of many cases that we have heretofore regarded as acute or chronic intestinal indigestion seems probable by the following:

1. The predominance of certain bacteria in the microscopic field which gives it a characteristic appearance.
2. The presence in culture made from the stools of a great number of certain kinds of organism.
3. The penetration of bacteria through the damaged mucosa and their presence in the blood and urine.
4. The contagiousness of these cases.
5. The appearance of such cases in epidemics, in hospitals and nurseries. The contagious nature of certain diarrheal diseases in babies is now well known. The contagion can be carried by flies, by soiled linen, by nurses' hands or by toys soiled by the discharges. In infant hospitals and nurseries these cases should be isolated and flies excluded from the room.

American Journal of Physiology, Boston

November

71 *Experiments on Absorption of Fat from an Isolated Loop of Small Intestine in Healthy Dogs. O. H. Plant, Galveston, Texas.
72 Hydrolysis of Fish Muscle. T. B. Osborne and F. W. Heyl, New Haven, Conn.
73 *Blood Pressure and High Altitudes. E. C. Schneider and C. A. Hedblom, Boulder, Colo.
74 *Acid Closure of the Cardia. W. B. Cannon, Boston.
75 Nature of the Conduction of Nerve Impulse. W. Sutherland.
76 *Comparative Study of the Vasomotor Reflexes. W. T. Porter and R. Richardson, Boston.

71. **Absorption of Fat.**—Plant experimented with fats, soaps and fatty acids as to their absorption from a loop of intestine. He reaches the following conclusions:

1. Bile salts greatly increase the absorption of fats from a mixture that contains free fatty acid or soap. They only slightly increase the absorption of neutral oil.
2. Solutions of soap, in the absence of other fat, are absorbed from a loop of intestine in greater percentage than emulsified fats; this is also true of fatty acid dissolved by bile salts.
3. Neutral oil can be absorbed without the action of either bile or pancreatic juice from a loop of intestine, when both these secretions are excluded. Under such conditions the neutral oil becomes markedly acid in reaction.
4. Taken as a whole, the results of these experiments favor the theory that fats are absorbed in solution rather than as emulsified fats.

73. **Blood Pressure.**—Schneider and Hedblom review the scanty literature on the influence of altitude on blood pressure and give their own observations. The pressure readings were taken with Erlanger's improved sphygmomanometer. The authors embody their results in the following conclusions:

1. A considerable elevation in altitude tends to lower systolic and diastolic blood pressure and to increase the rate of heart beat.
2. The fall in systolic pressure is slightly greater and more certain to occur than the fall in diastolic pressure.
3. A rise in diastolic pressure occurs in some individuals.
4. The influence of such factors as psychical states, eating, and exercise may obscure the influence of altitude on the blood pressure.
5. The fall in blood pressure and increase in heart beat are most marked in the early part of the residence at the higher altitude.
6. On a prolonged stay at high altitude the heart rate probably returns more nearly to the normal than the blood pressure.
7. High altitudes do not affect to the same degree the blood pressure of all individuals.
8. Small elevation in altitude does not appreciably influence the blood pressure.
9. Those individuals most affected by high altitude seem to sustain the greatest fall in systolic blood pressure and the greatest acceleration in the rate of heart beat.
10. The heat of the summer season probably accelerates the pulse rate.

74. **Closure of Cardia.**—Cannon finds that the cardia is kept closed by the presence of acid in the stomach, and that neutralization of the acid leads to regurgitations which cease when the stomach contents become normally acid.

76. **Vasomotor Reflexes.**—Porter and Richardson distinguish between fundamental and accessory functions in living tissues. The former are of ancient origin, and are in the main alike in all the higher animals, while the accessory functions vary widely in different species. They bring, in this paper, evidence that the blood pressure is to be classed with the fundamental phenomena. They find that the reflex rise of blood pressure on stimulation of the sciatic and the brachial nerves is quantitatively almost the same in the rabbit, cat, guinea-pig, rat and hen—animals differing greatly in structure. It is improbable that animals so diverse as those here stimulated would give quantitatively the same response were not the maintenance of blood pressure, like the maintenance of body heat, a fundamental phenomenon developed to the same high efficiency in many, perhaps in all, warm-blooded animals. The experiments afford good ground for concluding that the results of animal experiments on blood pressure, and on the vasomotor system generally, can be applied with confidence to human pathology and therapeutics.

American Medicine, New York City

November

77 *Temporal Bone; the Diseases to Which It Is Subject, Especially Otitis Media. F. E. Wallace, Pueblo, Colo.
78 Therapeutic Exercises. H. W. Frauenthal, New York.
79 Indicanuria. W. G. Morgan, Washington, D. C.
80 *The American Climate and the Northern European. A. O'Malley, Philadelphia.
81 Alcohol in the Tropics and American Schools of Tropical Medicine. C. E. Woodruff, U. S. Army.
82 Are We Being "Doctored" to Death? H. S. Baketel, New York.
83 A Fundal Condition Simulating Duplication of the Disc. J. W. Sherer, Kansas City, Mo.
84 Recent Literature on Dermatology and Syphilis. F. C. Knowles, Philadelphia.

77. **Therapeutic Exercises.**—Frauenthal insists that deep breathing, as a fine art, has to be taught. He urges the importance of adding breathing exercises to the therapeutic armamentarium, and concludes by emphasizing that the index to vital force is lung development, and in harmony with it go the development of the heart, and the more perfect conditions in the liver, kidneys, spleen, etc. He is opposed to muscle bulk and muscle building, also to violent exercise and heavy lifting, because their ultimate results to the individual are bad. Work should be done by the individual working alone, and not in classes.

80. **Climate and Europeans in America.**—O'Malley's observations show that the climate in the United States is very trying on people who come from northern Europe, and the excessive sunlight is the detrimental factor. The conclusion is that the people of northern European origin should in America avoid the sun glare as much as possible. Their vacations should be spent in woods, not in the light of the seashore, and they should sleep as long as possible to restore nervous strength. American physicians have long known that nervous patients do badly at the seashore, but they were not aware of the cause of this phenomenon. We should plant shade trees in all our cities, and remove enough of the pavement to let these trees grow. Many old families in New England towns owe not a little of their longevity to their shade trees. Our healthiest folk are in the northwest where there are most clouds. We must get away from the erroneous traditional opinion, brought here from cloudy northern Europe, that sunlight is good for us: in measure it is, in excess it is fatal.

Chicago Medical Recorder

November

85 *Lumbar Puncture and Blood Analysis in Diagnosis and Treatment of Meningococcic and Tuberculous Meningitis. J. F. Hultgen, Chicago.
86 *Diagnostic Considerations in the Surgical Affections of the Spinal Cord. J. Grinker, Chicago.
87 Hematuria. C. J. Drueck, Chicago.
88 *Eyework for the General Practitioner. A. Welchelt, Barrington, Ill.
89 The Ear Polyp; Its Clinical and Pathologic Manifestations. L. J. Goldbach, Baltimore.
90 The Health Operation. C. H. Long, Chicago.
91 The Real Tuberculosis Question. J. Burke, Manitowoc, Wis.

85. **Lumbar Puncture.**—Hultgen discusses lumbar puncture in regard to meningococcic meningitis, and thinks that in every case in which meningeal symptoms are present, even to a minor degree, we should at once perform lumbar puncture. He states that he knows of no contraindications. He gives a tabular illustration of the information to be gained from lumbar puncture in normal conditions, meningococcic meningitis, and tuberculous meningitis, respectively. In cerebrospinal meningitis it seems reasonable to him to prescribe repeated lumbar puncture, for it removes at least some of the toxic infectious material, and simultaneously diminishes or removes cerebrospinal pressure. In tuberculous meningitis, theoretically at any rate, the prognosis need not be hopeless. Many of the patients die from mechanical effects, not from its toxic sequelæ. The time will come when, with the aid of early lumbar puncture, we shall be able to differentiate between hopeless and hopeful cases. Finally, he reports a case of lumbar puncture with recovery, which, in the absence of positive findings in the fluid and of a tuberculous history in the family, he prefers to regard as one of recovery from serous meningitis.

86. Abstracted in the Society Proceedings in THE JOURNAL, June 27, 1908, p. 2152, and published in the *Illinois Medical Journal*, October, 1908.

88. **Eye Work for the General Practitioner.**—Weichelt discusses various eye symptoms that are not sufficiently appreciated by the general practitioner. Aside from local disease or from being a part of a general condition, swelling and puffiness of the lids tell us of anemia, cerebral thrombosis or renal edema; they are often diagnostic of measles, appear in variola and erysipelas, and are the warning indicator in the administration of arsenic and iodid. A stye may show eyestrain, or digestive or genital disorders. Blepharitis may lead us to suspect anemia or a catarrhal or strumous diathesis. Duskiness of the lids and under the eyes is seen in pregnancy, sexual abuse, certain menstrual disorders, fatigue, etc. Winking spasm occurs in chorea, hysteria, or tic douloureux. Lagophthalmos may be due to hysteria, facial paralysis or exophthalmic goiter. We look for oculomotor disturbances in meningitis, skull fracture, or intracranial hemorrhage. The pearly appearance of the sclerotic often points to phthisis, anemia, nephritis or Addison's disease, while the significance of a yellow eyeball is familiar to all. Conjunctival congestion, not due to local disease, may be present in typhus fever, meningitis, facial paralysis, neuralgia of the fifth nerve, and sometimes after full doses of potassium iodid. Subconjunctival hemorrhage appears in epilepsy, fracture of the base of the skull, Bright's disease and organic heart lesions. We have all looked for the "fishy" or puckered conjunctiva of approaching dissolution. The cornea gives us the arcus senilis of arteriosclerosis, gout, atheroma, chronic nephritis or syphilis. Iritis may help us to clear up a doubt in rheumatic affections. Pupillary symptoms are too well understood to be especially mentioned. Every general practitioner should know enough of the afflictions belonging to the domain of the ophthalmologist to realize when reference to a specialist is necessary. He should be able to use the ophthalmoscope well enough to detect anything abnormal in the fundus. Refraction is a part of ophthalmology on which the country doctor in particular might encroach. With some postgraduate study, he is infinitely better qualified to fit glasses than are clerks, druggists, and so-called doctors of optometry, who have usurped a part of the doctor's rights and privileges —and fees—with little or no study.

Washington Medical Annals

November

92 Applied Electrophysiology in Electrotherapeutics. F. B. Bishop, Washington, D. C.
93 *The Medical Witness in Lunacy Cases. P. C. Hunt, Washington, D. C.
94 *Chronic Neuralgia; Its Causes and Cure. R. Reyburn, Washington, D. C.
95 Case of Epithelioma of Uterus. D. S. Lamb, Washington, D. C.
96 Differential Diagnosis of Functional from Organic Forms of Motor Disability. T. A. Williams, Washington, D. C.
97 Adipocere, Ninety-six Years After Death. D. S. Lamb, Washington, D. C.

93. **Medical Witness in Lunacy Cases.**—Hunt discusses the present conditions affecting the medical witness in inquisitions in lunacy, in criminal cases, and in testamentary cases. He makes the following suggestions in regard to inquisitions in lunacy: The present law should be so altered that a patient should be detained at the hospital for care and treatment; if the patient's mental condition is such that he is unable to advise counsel, or if he is suffering from an acute psychosis that would be aggravated by the court proceedings, he should not appear. Also, if temporary commitment were to be extended from the present thirty-day limit to ninety days, during which time legal proceedings could be instituted, and the matter brought to the attention of the court, much good could be accomplished. In criminal cases, in his opinion, a law should be framed providing that a commission, consisting of the attending physician to the United States Jail, the superintendent of the Government Hospital for the Insane, and one or more alienists, should be appointed by the Supreme Court of the District of Columbia (or state) to examine every case in which the defendant is under serious charges, and that a written report be made to the presiding justice concerning the defendant's mental condition. If the defendant objects to this examination it should take place after conviction and before the prisoner is sentenced. In examining an alleged insane person a medical witness should provide himself with writing materials and take down the person's statements in the person's own words and his presence, at the time the words are uttered. Not only is this the only way of insuring the accuracy of the report, but it gives the examiner the right, which otherwise he could not have, of consulting his notes in court. The things contained in this report should be facts, not inferences from facts. Hunt points out that in examining the testamentary capacity of a person the physician should insist on seeing him alone, and making sure that he is free from the influence of drink, drugs, etc. He cites an eminent English authority on wills for the assertion that no will has been upset where a reputable physician has witnessed it after examining the testator's state of mind, and an agent of repute has drawn it up, provided neither of them takes any benefit under its provisions. He advises physicians to make an intending testator go carefully over the particulars of what disposition of his estate he wishes made, without prompting, suggestion or leading question, twice, with a quarter of an hour's interval between the two statements; to ascertain, if possible, from him if he had intended before his illness to will his property as proposed, and for how long a time before; and to try to get independent testimony from others on this point. In examining persons it is desirable to be perfectly impartial, to make no suggestion as to the propriety of the act or the settlement to be made, and on no account to influence the testator as to the disposition of his property.

Regarding the "hypothetical question," Hunt says that it is valid and legal, and will probably continue to be used; but if the witness will insist on having all the obtainable facts on which this question is based placed before him, including the person, if possible, whose mental state is in question, and, by conscientiously endeavoring to sift the chaff from the wheat, will compel the hypothetical question to be built on the foundation of truth, the alienist's reputation and power for good in the community will be greatly enhanced, and he will gain the respect of the judge and the confidence of the jury.

94. **Neuralgia.**—Reyburn holds that chronic neuralgia is due to a purely physical cause, viz.: increased blood pressure, and that all the remedies which relieve neuralgia act either as the anodynes do, by benumbing the sensory filaments of the nerve or diminishing the force of the circulation, or by aiding the blood vessels to resist the pressure on them. In addition to the usual remedies he has given ergot in full doses and on theoretical grounds with excellent results. It is especially useful in the chronic neuralgia of overfed women in the higher walks of life, who take little or no exercise. A fluid dram three times a day, with forced exercise and diminished food supply, is very efficient.

Journal Michigan State Medical Society, Detroit

November

98 *Cyclodialysis Versus Iridodialysis. P. J. Livingstone, Detroit.
99 *Distinction Between Hysteria, Neurasthenia, Hypochondria and Simulation. C. D. Camp, Ann Arbor, Mich.
100 *Preliminary Report on the Use of the Tubercle Residue of V. C. Vaughan in Surgical Tuberculosis. J. W. Vaughan, Detroit.
101 Recent Progress in Medicine and Surgery. H. E. Randall, Lapeer.
102 Puerperal Septicemia, Septic Gall-Bladder, Ectopic Gestation and Syphilis. F. J. Tibbals, Detroit.

98. **Cyclodialysis.**—Livingstone discusses the source of pressure in the eye, namely, the secretion from the blood stream, and considers that its source lies chiefly if not wholly in the ciliary portion of the uveal tract. He describes the operation of cyclodialysis as reported by Heine, and considers that the real indications for cyclodialysis are found in those cases in which iridectomy is not only difficult but dangerous.

99, 100. Abstracted in THE JOURNAL, Aug. 29, 1908, pp. 784, 785.

Bulletin American Academy of Medicine, Eaton, Pa.

December

103 *Report of the Committee on Education of the General Public in Medical Matters. E. Jackson, Denver, Colo.
104 *Hygiene in Public Schools. H. C. Putnam, Providence.

103, 104. Abstracted in THE JOURNAL, July 25, 1908, pp. 339, 340.

Laryngoscope, St. Louis

November

105 Roentgen-Ray Examination of the Accessory Nasal Sinuses. E. W. Caldwell, New York.
106 *Surgical Principle Essential to the Cure of Frontal Sinus Empyema. J. F. Barnhill, Indianapolis.
107 Operative Treatment of Suppuration of the Frontal Sinuses. A. Jansen, Berlin, Germany.
108 Variations in the Anatomy of the Frontal Sinuses. J. P. Tunis, Philadelphia.
109 Two Unusual Frontal Sinus Cases. J. P. Brown, Toronto, Canada.
110 Relation of Pathologic Changes in the Accessory Nasal Cavities to Diseases of the Eye. C. R. Holmes, Cincinnati.
111 Neuroses of the Nose. C. P. Grayson, Philadelphia.
112 New Flap in the Radical Operation. G. A. Leland, Boston, Mass.
113 Case of Probable Persistent Angioneurotic Edema of the Larynx and Soft Palate. T. H. Halsted, Syracuse, N. Y.
114 Conservative Turbinectomy. J. A. Watson, Minneapolis, Minn.

106. Published in the *Annals of Rhinology, Otology and Laryngology*, September, 1908.

Progressive Medicine, Philadelphia

December

115 Diseases of the Digestive Tract and Allied Organs, the Liver and Pancreas. D. L. Edsall, Philadelphia.
116 Diseases of the Kidneys. J. R. Bradford, London, Eng.
117 Surgery of the Extremities, Tumors, Surgery of Joints, Shock, Anesthesia and Infections. J. C. Bloodgood, Baltimore.
118 Genitourinary Diseases. W. T. Belfield, Chicago.
119 Practical Therapeutic Referendum. H. R. Landis, Philadelphia.

Colorado Medicine, Denver

November

120 Technic of Bier's Hyperemia. H. M. Cohen, Denver, Colo.
121 Surgical Treatment of Chronic Constipation. H. Heath, Denver.
122 Somnoform. C. G. Parsons, Denver, Colo.
123 Faith. C. A. Hadsell, Cedaredge, Colo.

Northwest Medicine, Seattle, Wash.

November

124 Rational Treatment of Congenital Club Foot. J. C. Shapps, Butte, Mont.
125 Surgical Treatment of Paralytic Deformities with Plea for Their Prevention. E. A. Rich, Tacoma, Wash.
126 Head Injuries. W. H. Axtell, Bellingham, Wash.
127 International Congress on Tuberculosis. B. S. Paschall, Seattle, Wash.

Iowa Medical Journal, Des Moines

November

128 Supports of the Uterus. G. E. Decker, Davenport, Iowa.
129 Treatment of Retrodeviations of the Uterus. C. Wahrer, Fort Madison, Iowa.
130 Uterine Hemorrhage. B. S. Walker, Corydon.
131 Operative Conditions of the Menopause. E. E. Dorr, Des Moines.
132 Three Cases of Leukemia. W. L. Bierring, Iowa City.
133 Tuberculosis of the Joints and Its Modern Treatment. J. Rudis-Jicinsky, Cedar Rapids.

Alabama Medical Journal, Birmingham

November

134 Typhoid—Etiologic Factors. R. B. Harkness, Birmingham, Ala.
135 Adenoids in Young Adults. C. Fox, Birmingham, Ala.
136 Acute Gastric and Duodenal Dilatation Treated by Gastro-jejunostomy, with Recovery. G. Torrance, Birmingham, Ala.
137 Medical Expert Testimony from a Judicial Standpoint. L. H. Lee, Montgomery, Ala.
138 Clinical Examination of Urine and Gastric Juice by the General Practitioner. C. F. R. Weiss, London, England.

Military Surgeon, Carlisle, Pa.

November

139 Relation of the Military and Naval Forces of the United States to Public Health. W. C. Rucker, Public Health and Marine-Hospital Service.
140 Work of the Board for the Study of Tropical Diseases in the Philippines. H. J. Nichols and J. M. Phalen, U. S. Army.

FOREIGN

Titles marked with an asterisk (*) are abstracted below. Clinical lectures, single case reports and trials of new drugs and artificial foods are omitted unless of exceptional general interest.

British Medical Journal, London

December 5

1 *Use and Abuse of the Curette. G. E. Herman.
2 Pregnancy Complicated by Fibromyomata of the Uterus. F. W. N. Haultain.
3 Puerperal Eclampsia. J. Lytle.
4 *Physiology of the Fallopian Tube. J. T. Shirlaw.
5 Uterine Arteriosclerosis. J. Pearse.
6 Axis-Traction Forceps. J. R. Purdy.
7 *Some of the Effects of Excessive Smoking. J. D. Mann.
8 Case of Osteitis Deformans. S. White.
9 Case of Cancer of the Right Breast "Cured" by the Cardigan "Cancer Cures." J. L. Thomas.
10 Syphilis Communicated by Industrial Implements. S. Snell.

1. **The Curette.**—Herman says that there are three apparently widely accepted reasons for using the curette, namely: (1) Curetting merely because the patient is anesthetized for some other operation, the curetting being apparently supposed to be in some way beneficial to a healthy uterus. (2) Curetting a uterus which has been infected with pathogenic microbes, with the idea that it is possible to scrape away the whole of the infected tissue. (3) Curetting neurasthenic patients for pain, without excessive hemorrhage, the pain being supposed to be due to endometritis brought about by variations in the shape and size of the uterus, all these changes never having been shown to be more pathologic than variations in the size of the lobule of the ear. Curetting for such reasons as these seems to him so useless that it deserves to be described as an abuse. He emphasizes the fact that curette and curettage, Anglicized, means simply scraper and scraping, which is a true description of the purpose. The use of the scraper is to remove new growths, either as a treatment or for diagnosis. In any case of hemorrhage severe enough to weaken the patient, for which bimanual examination shows no adequate cause, the proper treatment is to dilate the cervix and explore with the finger the uterine cavity. If nothing is found, the endometrium may be scraped and the scrapings examined microscopically; but there is no justification for repeated scrapings. Particularly, repeated scrapings to relieve pain constitute an abuse of the curette. The use of the scraper is to detach something that is causing trouble, not to relieve pain.

4. **Physiology of the Fallopian Tube.**—Shirlaw emphasizes the following points: The probability is that when a pregnant ovum remains in the tube, this occurrence is due to one of two things or to a combination of the two; either there has been too little secretion, or there has been a diminution in the lashing movement of the cilia from a previous salpingitis.

7. **Excessive Smoking.**—Mann discusses the substances found in tobacco smoke, and concludes that nicotin is its sole potential poisonous constituent, inasmuch as the other poisonous bodies, including the pyridin bases, are equally present in the smoke from nicotin-free tobacco, the use of which by healthy non-smokers was found not to give rise to the circulatory disturbances caused by smoking ordinary tobacco. Nicotin may be absorbed through the unbroken skin. Mann particularly condemns the habit of holding the remains of a moist cigar or cigarette in the lips after it has gone out. He discusses the effects in two stages, the early stage of functional disorder and the later stage of organic disease. He concludes as follows: It is obvious that with all physiologically active substances the question of degree

is largely determinative of the results produced by an agency that is capable of affecting the health. Most men, if they choose to smoke, can do so within certain limits without injuring their health; some men can exceed such limits with apparent impunity. The extent of the limitation must be determined by each man for himself, and, if he is wise, he will keep well within the borderline and will hold to his resolution. Here lies the difficulty: the growth of a habit overrides discretion. The habit of excessive smoking is more insidious in its development than that of excessive drinking, for the results are much less obvious. An alcoholic may be appealed to by his friends or admonished by those in authority; this rarely happens to the adult smoker, unless he consults his doctor about "indigestion and palpitation" and admits that he smokes to excess; then probably the necessary warning will be given.

Lancet, London

December 5

11 Latent Persistence and the Reactivation of Pathogenic Bacteria in the Body. L. S. Dudgeon.
12 Treatment of Syphilis by Arylarsonates. F. J. Lambkin.
13 *The Common Cold: Its Pathology and Treatment. (Concluded.) R. W. Allen.
14 *Prophylaxis in Acidosis Following Anesthesia. F. H. Wallace and E. Gillespie.
15 Aneurism of the Anterior Cerebral Artery. A. S. MacNalty.
16 Bacterial Contamination of Milk; the Connection Between Flies and Epidemic Diarrhea. J. T. C. Nash.
17 Case of Traumatic Exophthalmos. D. Ranken.
18 Extension of a Pleural Effusion Toward the Sound Side in a Still-born Child. R. D. Keith and A. Keith.

13. **The Common Cold.**—Allen summarizes his articles, concluded in this issue, as follows: 1. It has been shown that there are at least five organisms capable of the production of an attack of acute nasal catarrh, viz.: (a) the *Bacillus influenzæ;* (b) the *Bacillus septus* [*septicus?*]; (c) Friedländer's bacillus; (d) *Micrococcus catarrhalis*, and (e) *Micrococcus paratetragenus*. 2. These may be present in the nasopharyngeal space in a certain percentage of cases which exhibit no pathologic features; increase of virulence and lowered resistance of the tissues may then light them up into activity. In other cases the infection is one from without. 3. Each organism produces its own type of cold, and a differential diagnosis of the organism is possible from a consideration of the clinical features; this is more difficult should the infection be a multiple one. 4. This differential diagnosis is of considerable value both in prognosis and in treatment. 5. Chronic nasal catarrh is probably always due to infection by the bacillus of Friedländer, unless the Eustachian tube and middle ear be involved by the *Micrococcus catarrhalis;* chronic tracheal catarrh to infection by the *Micrococcus catarrhalis* or *Micrococcus paratetragenus*, to which secondary infection by staphylococci, streptococci, pneumococci, and other pathogenic organisms may be superadded. 6. For infection, local defect of opsonin, and for cure, increase of opsonin, are probably necessary conditions. 7. By means of the injection of the corresponding bacterial vaccines an attack of acute cold due to any given organism or organisms can be considerably shortened and complications be probably prevented. 8. In a similar manner chronic infections may be cured. 9. By injections of the vaccines of the several organisms in appropriate doses and at appropriate intervals considerable, if not complete, immunity against future attacks of acute cold may be secured. In those who are very susceptible and fall victims to every epidemic that may occur, the best procedure probably is systematic immunization every four to six months against all the "cold" organisms, and special immunization against the particular organism or organisms which may be responsible for the appearance of subsequent epidemics against which protection is desired.

14. **Acidosis Following Anesthesia.**—Wallace and Gillespie conclude their paper as follows: 1. That so far as prophylaxis by drugs is concerned glucose has a much greater power in controlling the acetonuria than sodium bicarbonate. 2. That the secondary vomiting is in direct relation to the amount of acetone produced. 3. That anesthetics should be given by an open method. 4. That in all cases of vomiting lasting over 12 hours the stomach should be washed out with a solution of sodium bicarbonate, leaving some fluid in that organ.

Medical Press and Circular, London

November 25

20 Influence of Diathesis on Causation and Treatment of Diseases of the Eye. A. M. Ramsay.
21 Hygienic Principles and Mental Efficiency. T. S. Clouston.
22 Pulmonary Actinomycosis, Its Great Relative Frequency. N. Bridge.
23 *Heredity in Diseases of the Nervous System. Sir W. Gowers.

23. Published in the *Lancet*, Nov. 21, 1908, and *British Medical Journal*, Nov. 21, and abstracted in THE JOURNAL, Dec. 19, p. 2189.

Clinical Journal, London

November 25

24 Lead Poisoning. F. M. Sandwith.
25 Lenhartz Treatment of Gastric Ulcer. W. L. Brown.

Quarterly Journal of Medicine, London

October

26 Extensive Atheroma and Dilatation of the Pulmonary Arteries, without Marked Lesions, as a not Very Rare Cause of Fatal Cardiac Disease in Bengal. L. Rogers.
27 Complete Heart Block. A. M. Gossage.
28 *Rheumatic Myocarditis. C. Coombs.
29 Mongolism and Its Pathology; an Analysis of Eight Cases. W. B. Hill.
30 *Medical Aspects of Pyelitis in Pregnancy. E. Ward.
31 Polycythemia, Erythrocytosis and Erythremia. F. P. Weber.

28. **Rheumatic Myocarditis.**—Coombs summarizes his article as follows: Macroscopic Myocardial Changes.—(1) Dilatation of both ventricles is constant, and often of considerable degree. The auriculo-ventricular orifices share in the stretching. (2) Hypertrophy of both ventricles is usually present, and in many instances without any obvious mechanical cause. (3) The naked-eye appearance of the cardiac muscle is but little altered as a rule.

Histologic Changes: (1) The parenchymatous cells are the seat of a fatty change, which is most pronounced in the wall of the left ventricle, particularly in the papillary muscles and beneath the pericardium. No other important change has been constantly noted in the cells themselves. (2) In the stroma, nodules are formed consisting entirely of large cells, many of which are mutinucleate, and which seem to be fibroblastic in nature. In the formation of these nodules other cells play quite a subordinate part. They develop especially in the neighborhood of arteries and arterioles; the left ventricle is far more affected than the right, particularly near the root of the aorta and the mitral ring, and at the apex near the interventricular septum. Few nodules are found in the septum itself, and the same applies to the papillary muscles. (3) Foci of leucocytosis, chiefly polymorphonuclear, are also seen. These are pericapillary, and are found especially in the papillary muscles. (4) Various arterial inflammations occur, especially a nodular periarteritis. Aortitis is generally present. (5) In hearts which have passed through a stage of active carditis certain cicatricial lesions of the myocardium remain to mark the sites of previous nodules.

Interpretation of the Above Changes: (1) The nodules are inflammatory and probably represent a reaction of the connective tissues at the actual points of infection. They appear to be characteristic of rheumatic as opposed to other forms of carditis, and changes histologically similar are seen in rheumatic endocarditis and pericarditis and subcutaneous rheumatic nodes. Their close relation to the arteries is a further proof of the fact that in rheumatic carditis the heart is invaded by the coronary avenues. (2) The areas of leucocytosis represent edema due to passive venous congestion. (3) Toxemia accounts for, no doubt, the greater part of the fatty metamorphosis; but it must be remembered that a similar change occurs as the result of chronic venous congestion and of hypertrophy, both of which are seen in most cases of rheumatic carditis. (4) Ventricular dilatation is to be ascribed to muscular atony under the influence of toxemia. It is greater in degree than the histologic changes would lead one to expect. The hypertrophy of the ventricles, occurring, as it does sometimes, without obvious cause, may also be referable to the "direct" action of some toxin. There is some evidence to support the view that the poison produces this effect by inducing myocardial overaction. The myocardial lesions occurring in rheumatic carditis are of so special a kind as to lend definite support to the conception of a specific rheumatic infection.

The Influence of the Foregoing Lesions on the Cardiac Functions: (1) The physical signs characterizing the rheumatic heart disease of childhood are in a majority of cases referable to the myocardial lesions, and not to those of the serous layers. This is substantiated by postmortem evidence. (2) Death during childhood from rheumatic carditis is, more often than not, directly due to myocarditis. (3) Some, at any rate, of the deaths, occurring in rheumatic heart disease during adolescence and early adult life are probably caused by the muscular lesions.

30. **Pyelitis in Pregnancy.**—Ward distinguishes "the pyelitis of pregnancy which has come to be so well recognized," which he terms encopyelitis, from pyelitis in pregnancy, viz.: "those cases in which pyelitis occurs in pregnancy owing to some previous disease which might well have caused it at some other time." He concludes that encopyelitis is commoner than is usually thought. Every practitioner in the course of a lifetime will meet with a few cases. More attention, therefore, should be paid to this disease in the medical schools. The disease is due to an infection of the kidney pelvis with organisms, usually *Bacillus coli communis*, and these organisms usually follow an ascending course. A similar infection can occur in women apart from pregnancy, and even in men. The prognosis, both immediate and remote, is worse than has been hitherto supposed. The treatment should be medicinal, by the internal administration of hexamethylentetramin, and if this does not succeed, labor should be induced without undue delay. Nephrotomy should never be performed until the obstetrical treatment has failed and the patient is still ill after the puerperium. Nephrectomy is only justifiable in rare cases as a cure for a persistent fistula or when the kidney is completely disorganized.

Practitioner, London

November

32 Home Treatment and Nursing of Pulmonary Tuberculosis in Dublin. Sir W. J. Thompson.
33 Infective or Ulcerative Endocarditis. N. Tirard.
34 *Adherent Pericardium. W. J. Fenton.
35 Account of the Theory and Employment of Bier's Method of Treatment by Passive Congestion in Case of Rheumatoid Arthritis, Tubercle Sepsis, and Various Other Conditions (continued). A. W. Wakefield.
36 Gastric Ulcer. L. H. L. Mackenzie.
37 Recent Work in Diseases of Children. G. F. Still.
38 The Stomach. F. C. Moore.
39 Medical Inspection of School Children. R. P. Williams.
40 Neoplasm of the Kidney Presenting Certain Unusual Features. R. Parnell and R. Gompertz.

34. **Adherent Pericardium.**—Fenton considers especially two types of adherent pericardium: (1) the form in which, while there is close adhesion within and obliteration of the pericardial sac, no appreciable clinical or pathologic results are produced, the lesions appearing to be entirely without effect; and (2) where adhesion is accompanied by marked cardiac hypertrophy and dilatation, serious embarrassment of the circulation, and early death of the patient.

Out of 150 cases of adherent pericardium in which the cause of death was specifically stated in the postmortem records to be the direct result of the heart lesion, 65 were found during the first three decades and 17 in the last four; while, where death had followed on causes unconnected with the heart, 13 only were found during the first three decades, and 55 in the last four. Thus, there is an almost precisely opposite state of affairs in cases found in the first three and last four decades, respectively.

Fenton concludes that (1) the two types of adherent pericardium are found at different periods of life. The first, or grave, form occurs under 30; the second form, which has little or no significance clinically, after that age. (2) A history of rheumatism is almost always associated with the former, while it is absent in the latter. (3) The former is accompanied by valvular disease in by far the greater number of instances, while in older cases an opposite state of things is observed, but in a certain proportion of young cases valvular disease is absent, the clinical and pathologic results being apparently produced solely by the condition of the pericardium; in the older cases, conversely, a few show coincident valve disease. There are no physical signs or symptoms by which the presence of adherent pericardium can be recognized with certainty, but, taking into account all factors present, a correct diagnosis may be reached in a fair proportion of cases. The great difficulty occurs when the question is complicated by the existence of aortic regurgitation. Everything depends, then, on how much regurgitation there is. The whole question of diagnosis depends on the correlation of signs or symptoms and the relation of signs to one another. The most important thing is to remember the possibility of existence of adhesions, and they are suggested whenever serious symptoms of cardiac failure are found in a young patient, in whom the physical signs do not appear sufficient to account for their severity, or when excessive enlargement of the heart exists in the absence of aortic disease.

British Journal of Children's Diseases, London

November

41 *Deafness in Relation to School Medical Inspection. M. Yearsley.
42 Patent Ductus Arteriosus. J. E. H. Sawyer.
43 Non-Development of the Lower Extremities in Twins. F. V. Milward.
44 Supposed Maternal Impression. C. H. Melland.

41. **Deafness in School Children.**—Yearsley discusses the enormous importance of perfect hearing in the intellectual and moral development of children. He describes as follows the development of the relations existing between hearing, understanding and speech: In the language of a nation, certain articulate sounds become the symbolic representatives of certain definite ideas, learned by each child first as sounds, later as symbols. The sounds are first registered in the cortical center for hearing, and it is under the guidance of this center that the child trains the motor center to articulate the sounds, thus getting second images imprinted on the cortical motor center for speech. The motor reproduction of sound becomes so interesting that the child reproduces many sounds by echolalia, without attempting to understand them. Before echolalia is exhibited, however, the child obtains a number of word memories imprinted on the auditory center before he can articulate a single one of them, and these are even associated with their proper meanings. At this stage the education of the receptive center is ahead of that of the productive (motor) center. This short explanation will serve to demonstrate how much depends not only on the auditory receptive center, but on the integrity of the channels—the auditory receptive conductive apparatus—which carry the sound to the center. When there is any defect of hearing the development of speech suffers, and with it the mental development of the child. Yearsley discusses the various pathologic conditions that form the basis of inattention. Children with adenoids and nasopharyngeal catarrh are easily fatigued and their capacities vary with the state of the weather, dampness rendering them more defective. Teachers should understand that children who make little progress and are inattentive should be presented for medical examination before being set down as refractory. He enumerates the various tests for hearing, of which speech is the most important; the tests should be applied in the presence of the teacher. All pupils should be examined as regards their hearing in the first year of school life. This examination should consist of a preliminary inspection of all children, with testing of hearing acuity, by the school doctor, and a special examination by an otologist of those found wanting. Both examinations should be repeated for all children kept back in their classes, and in all who have, in the course of the year, suffered from any of the exanthemata or shown signs of ear disease. To make the results of practical value, the examinations should be made in the presence of the teacher, and every case should be followed up as regards the seeking of treatment. When a child is brought up for examination as dumb, the medical inspector must decide whether it is mentally defective or deaf. He should, therefore, satisfy himself as to (1) the condition of the hearing; (2) the child's play and general conduct; (3) its habits as regards cleanliness; (4) its affection and manageableness; (5) the condition of the ears, nose and throat. Yearsley then discusses extensively the education of the deaf child, and the question of its being taught in the ordinary classes, in special classes in the ordinary schools, or in special schools according to the degree of defect.

Journal of Tropical Medicine and Hygiene, London

November 2

45 Preliminary Note on a Protozoon in Yaws. A. Robertson.
46 Cholera Carriers. J. R. Forrest.
47 *Sutlka: Puerperal Diarrhea of Bengal. F. Pearse.
48 *Engineers and Malaria. M. Watson.
49 The Avian Hemoprotozoa of the Genus Leucocytozoon (Danilewsky). L. W. Sambon.

November 16

50 Continued Fever of Non-Malarial Origin. T. Gann.
51 *Recent Advances in Science and Their Bearing on Medicine and Surgery. S. P. Manson.

47. This article appeared in the *Lancet*, Nov. 7, 1908.

48. **Engineers and Malaria.**—Watson says that engineers do not yet realize the enormous influence for good or evil which they possess. Many details of work may be of little consequence from an engineering point of view, but of vital importance to the public health in a tropical country. In order to avoid friction between engineers and medical officers, a certificate should be required from the former, when reporting the completion of their work, that as far as practicable no unnecessary pools have been created and drainage has not been interfered with. It will take years for the new ideas on malaria to take a place in the consideration of the engineer when designing or carrying out new works.

51. This article appeared in the *Lancet*, Oct. 3, 1908, and was abstracted in THE JOURNAL, October 31, page 1553.

Journal of Obstetrics and Gynecology of British Empire, London

November

52 Malignant Melanoma of the Vulva. E. Holland.
53 *Two Cases of Uterine Fibroid Showing Perithelliomatous Changes: Long Immunity from Recurrence After Operation. A. H. G. Doran and C. Lockyear.
54 Case of Perithelioma of the Endometrium. G. F. D. Smith.

53. This article appeared in the *British Medical Journal*, Nov. 21, 1908.

Annales de Gynécologie et d'Obstétrique, Paris

November, XXXV, No. 5, pp. 641-704.

55 *Operative Obstetrics in Dystocia Due to Pelvic Deformity. Pinard.
56 *Uterine Cancer Interfering with Delivery. (Cas de cancer utérin cause dystocie.) A. Herrgott.
57 Delivery with Stricture of the Vagina. (Rétrécissement du vagin.) S. Pozzi. Id. Hartmann. Id. Couvelaire.
58 *Conservative Cesarean Section. (Série de 14 opérations césariennes conservatrices.) J. Mouchotte.

55. **Management of Difficult Delivery Due to Deformed Pelvis.**—Pinard urges never to use force when a woman is in labor, as the result is a wounded or killed infant, and he also proscribes without reserve all intervention for inducing abortion or premature delivery. Since 1890 he has performed symphyseotomy in 141 cases, the Porro operation in 22, and conservative Cesarean section in 30, more than half of the latter during the last two years. He has been growing bolder with the progress in surgical technic, and now believes that the field for conservative Cesarean section should be enlarged. He regards it as indicated in all cases of extreme deformity of the pelvis and the "limit" cases, but not until labor has commenced. This inclusion among the indications for conservative Cesarean section of the "limit" and "surprise" pelves he regards as great progress in obstetrics. Labor must be under way, and the cervix not fully dilated, with symptoms threatening mother or child or heralding approaching rupture. In his 30 cases, all the women and children left the hospital in good condition. Symptoms of infection, of course, contraindicate Cesarean section, but he protests against the assumption that a hospital environment is necessary, saying that every physician worthy of the name should be competent to do a Cesarean section. All physicians should know now how to realize asepsis anywhere, for the childbirth as well for an operation.

56. **Cancer Interfering With Delivery.**—Herrgott reports a case to illustrate his view that with a cancer interfering with delivery, the safety of the child should be the main preoccupation. The child in this case was delivered by Cesarean section, after which the uterus was removed, but there are indications of recurrence of the cancer at present, nine months later. The child is healthy.

58. **Conservative Cesarean Section.**—Mouchotte reports 14 cases and says that the technic is extremely simple, being merely "two incisions, two sutures." He drains under all circumstances, as, he says, it is always useful and often necessary.

Bulletin de l'Académie de Médecine, Paris

November 10, LXXII, No. 36, pp. 317-374.

59 *Diagnosis and Etiology of Aortic Aneurism. (Anévrisme de l'aorte.) E. Boinet.
60 *Prophylaxis of Contagious Diseases.

November 17, No. 37, pp. 379-404.

61 *Medical Treatment of Pelvic Affections. L. G. Richelot.

59. **The Larynx with Aneurism of the Aorta.**—The autopsy of the case illustrated showed that the changes in the larynx observed were the result of pressure from the aneurism in the arch of the aorta pushing the trachea toward the left and back. The larynx was unusually low and twisted to the left. The case also explains the mechanism of the retrograde venous reflux in the right external jugular. The aneurism compressed both recurrent laryngeal nerves and projected into the supraclavicular fossa, simulating a concomitant innominate aneurism. Both suprarenal capsules were much enlarged, but there was no arterial hypertension or arteriosclerosis. Influenza was the only infectious disease in the previous history.

60. Summarized in Paris Letter, page 1985.

61. Ditto.

Archiv für Kinderheilkunde, Stuttgart

XLIX, Nos. 1-2, pp. 1-160. Last indexed Oct. 24, p. 1469.

62 Study of Secretion of Gastric Juice and Saliva in Child with Artificial Esophagus. (Zur Kenntnis der Magensaftsecretion nebst einigen Bemerkungen über Speichelsecretion.) P. Sommerfeld.
63 Secretion of Gastric Juice in Infants. (Magensaftsecretion beim Säugling.) Engel.
64 Ultramicroscopic "Dust" in Milk: Lactoconia. B. Mautner.
65 Clinical Study of Paratyphoid and Mixed Infection with Measles. E. Stolkind.
66 Treatment of Pneumonia with Antipneumococcus Serum. (Behandlung der genuinen Pneumonie mit Römer-Pneumokokkenserum.) A. Monti.
67 *Causes for Lateral Curvature of the Spine. (Zur Entstehung der seitlichen Wirbelsäulenverkrümmungen.) G. Muskat.

67. **Causes for Lateral Curvature of the Spine.**—Muskat thinks that the influence of the school has been overestimated, and that the tendency to curvature is implanted in earlier life. Carrying an infant always on the same arm is one of the factors in its development. Another is the way in which older persons lead children by the hand in the street, drawing up one side of the child's body and twisting it out of shape. The older person's hand can not reach the upstretched hand of a little child, and the gap is bridged by dragging up the child's hand above its natural level. The left shoulder is pulled up in the air, the other shoulder depressed, with the result that a tendency to left scoliosis is implanted in the child's spine. Too long sitting without change in school and the carrying of school books are liable to aggravate existing scoliosis or develop it. The school-produced scoliosis is a left, convex, high dorsal scoliosis, while experience shows that this is comparatively rare. Left lateral scoliosis is far more common, and this is traceable to the period before the school age is reached.

Presse Médicale, Paris

November 25, XVI, No. 95, pp. 761-768.

68 *Hereditary Sudden Death. (Mort subite héréditaire.) A. Gilbert and A. Baudouin.

68. **Hereditary Sudden Death.**—Gilbert and Baudouin have encountered in the last few months six families in which there seems to be an inherited tendency to sudden death. Fourteen members of these families have died suddenly after a history of recurring syncopes. Only three were women, and the deaths occurred between the ages of 20 and 62. They believe that this diathesis is more common than is generally recognized, family interests impelling its concealment. In one case the patient had six long syncopes before the fatal one, twice as a child, twice in college, and once during his military service. These syncopes lasted sometimes for twenty minutes, and this peculiar gravity differentiates this type from a simple

swoon. Death occurs instantaneously, from arrest of the heart. Knowledge of this diathesis explains certain cases of sudden death. Treatment can be only by prophylactic hygiene, they say.

Berliner klinische Wochenschrift

November 16, XLV, No. 46, pp. 2053-2092.

69 Removal of Tumor in First Left Temporal Convolution. (Operativ entfernte Hirngeschwulst aus der Gegend der linken Insel und ersten Schläfenwindung.) H. Oppenheim and F. Krause.
70 *Enlargement of Heart and Liver as Early Sign of Pulmonary Tuberculosis. (Herz-Lebervergrösserung, ein Frühsymptom der Schwindsucht.) S. v. Unterberger.
71 Roentgen Treatment of Skin Affections. (Röntgenbehandlung der Hautkrankheiten.) A. Blaschko.
72 *Rubber Ball Treatment of Nasal Affections. (Neues Verfahren zur Behandlung von Nasenleiden.) Sprenger.
73 *Stimulation of Intestinal Peristalsis by Injection of Hormone Extracted from Stomach Mucosa. (Spezifische Anregung der Darmperistalpik durch intravenöse Injektion des "Peristaltik-Hormons.") G. Zuelzer, M. Dohrn A. Marxer.
74 Influence of Fats on Tryptic Digestion (Beeinflussung der tryptischen Verdauung durch Fettstoffe.) J. Neumann.

November 23, No. 47, pp. 2093-2128.

75 *Renal and Ureteral Changes in Prostatic Enlargement. (Entstehung von Veränderungen an Harnleitern und Nieren bei Prostatahypertrophie.) J. Tandler and O. Zuckerkandl.
76 The New Magnet Operating Room. J. Hirschberg.
77 *The Ophthalmodiaphanoscope and Its Application in Medicine. C. Hertzell.
78 *Experimental Influencing of Pregnancy. (Experimentelle Beeinflussung der Gravidität.) J. Hofbauer.
79 Cholera at Odessa, September, 1908. N. T. Gamaleia.
80 *Simple Method for Serodiagnosis of Syphilis. N. Tschernogubow.

70. Abstracted in THE JOURNAL, Oct. 10, 1908, page 1253.

72. **New Method of Treating Nasal Affections.**—Sprenger applies the general principles of resting an inflamed part and keeping further irritation away from it. The nasal mucosa is peculiarly exposed to thermic, mechanic and chemical irritation—its physiologic task is to arrest such irritating agents to prevent their further invasion of the air passages below. If the nasal mucosa becomes inflamed, a vicious circle results, constantly growing worse. Healing is possible only by removing all possibility of further irritation and giving the inflamed mucosa a chance to heal. This he accomplishes by the use of a ball of very soft rubber, about 12 mm. in diameter, pushed into the nostril to occlude the passage. He has the ball introduced alternately into the nostrils and left in place for half to three-quarters of an hour, several times a day. There is a small handle to the ball, and this is all that shows. The ball not only keeps away irritation and rests the mucosa, but it induces local hyperemia and a warmer temperature, and the patient experiences great relief, while healing rapidly proceeds.

73. **Therapeutic Utilization of Natural Hormone That Stimulates Peristalsis.**—Zuelzer states that he has succeeded in isolating the natural hormone from the stomach mucosa which provides the physiologic stimulus for intestinal peristalsis. It is found in the stomach mucosa only during the acme of digestion; the mucosa of the fasting stomach does not contain it. It is extracted with salt solution or diluted hydrochloric acid from the stomach mucosa and the albumin is removed with alcohol. This hormone, like all the others, acts by way of the blood. Injected into a rabbit's vein, energetic peristalsis, starting at the duodenum and running to the rectum, is at once set up. The action of the hormone is similar to that of physostigmin in some respects, but the latter is more of a tetanic contraction, and the contraction persists, while the hormone induces true peristaltic waves. The discovery of this peristaltic hormone also modifies some of the present conceptions in regard to constipation.

75. **New Explanation for Renal and Ureteral Changes in Prostatic Enlargement.**—Tandler has been impressed with the constant normal aspect of the mouths of the ureters in the bladder when there was serious disturbance from dilatation from the ureters and stagnation of urine in the kidneys. The dilatation of the ureter commences abruptly at the point where it is crossed by the vas deferens. The enlargement of the prostate changes the position of the vas, pulling it down until it compresses the ureter, which becomes dilated above. This is probably the explanation for the ureter colics, sometimes observed with enlarged prostate. The kidney functioning suffers, and gastrointestinal symptoms follow. The improvement in the kidney disturbances with enlarged prostate when the retention in the bladder is cured does not contradict the facts presented. As the bladder subsides when its contents are evacuated, the relation between the vas and the ureter is modified, and thus the ureter becomes more permeable. Severing the vas must have the same favorable influence on the outlet for the urine from the kidney, and this fact should be borne in mind in considering a palliative operation. Also in considering prostatectomy, stagnation of urine in the kidney, even without retention in the bladder, should be accepted as an indication for operation. It seems as if in such cases the removal of the prostate is more urgently required than in the cases of uncomplicated chronic retention in the bladder which hitherto has been the main motive for the operation.

77. **The Ophthalmodiaphanoscope.**—Hertzell illuminates the eye from the rear by introducing a powerful light into the back of the mouth. The patient wears a black mask, covering all but the eyes.

78. **Experimental Influencing of Pregnancy.**—Hofbauer reports experiments in which cholesterin, the physiologic opponent of lecithin, was fed to gravid animals. He gave the cholesterin added to the food. In every case there were destructive changes in the placenta, evidently the result of the action of the cholesterin on the lecithin which abounds in the placenta. The changes in the placenta resembled in every respect those observed in syphilitic placentæ. This suggests the possibility of a uniform explanation of the various facts observed in regard to the action of cholesterin—the "physiologic antipode of lecithin"—in syphilis and in cancer, the tissues in the latter being unusually rich in lecithin.

80. **Simple Method of Serodiagnosis of Syphilis.**—The simple technic described allows the serodiagnosis by the occurrence of hemolysis. An alcoholic extract of desiccated syphilitic liver tissue and one drop of blood are required.

Correspondenz-Blatt für Schweizer Aerzte, Basle

November 15, XXXVIII, No. 22, pp. 713-744.

81 *Tendency to Convulsions in Young Children: Spasmophilia. (Die idiopathischen Krämpfe des frühen Kindesalters.) E. Feer.

81. **Idiopathic Convulsions in Infancy.**—Feer approves of the term "spasmophilia" to designate the morbid condition characterized by galvanic and mechanical overexcitability of the peripheral nerves and by the tendency to certain tonic and clonic, local or general spasms. He describes some typical cases; in one the convulsions were accompanied by facial and auditory hallucinations. Many of the convulsions formerly ascribed to casual toxic or sympathetic causes are now known to be due to this spasmophilic diathesis. Children with this tendency often display an acute increase in galvanic excitability at the onset of a febrile infection, even when no convulsions are observed. Convulsions are especially liable in these children during influenza, whooping cough and tonsillitis. The so-called reflex convulsions nearly all belong to this spasmophilic condition, especially the convulsions from teething, which many doctors and mothers accept as a convenient and tranquilizing explanation for the disturbances. Feer has made a special study of these "teething" disturbances, but has never become convinced that dentition is capable alone of inducing any essential morbid symptoms. He has never encountered any cases of "convulsions from teething," but he has frequently found that the so-called dentition convulsions were the result of spasmophilia. He calls attention to the prevalence of the convulsions during the winter and early spring, when the children are kept housed in unventilated rooms. The same injurious influences which favor spasmophilia also favor rachitis. Both are rare in breast-fed children. Experiments in his clinic have shown that lime has nothing to do with the etiology of spasmophilia, but that there is some close connection between it and the parathyroid bodies. In his experience, the spasmophilia never passed into true epilepsy. If the child must be artificially fed, the amount of food should be reduced to the minimum; calomel and re-

striction to tea or water for a day or so, followed by gruel and phosphorus and cod liver oil, are the measures recommended, with artificial respiration in severe spasm of the glottis, chloroform and chloral. It is possible, he remarks, that implantation of fresh parathyroid bodies may yet prove useful in spasmophilia.

Deutsche medizinische Wochenschrift, Berlin

November 19, XXXIV, No. 47, pp. 2009-2056.

82 *Dilatation of Heart. (Herzdilatation.) E. Romberg.
83 *Importance of Cellulose in Diet of Diabetics. (Weitere Beobachtungen über die Bedeutung der Zellulose—Hemizellulose—für die Ernährung der Diabetiker.) A. Schmidt and H. Lohrisch.
84 *Special Form of Disturbance in Orientation and Its Occurrence in Mental Affections. (Eine besondere Form von Orientierungsstörung und deren Vorkommen bei Geisteskranken.) A. Pick.
85 *Justification and Technic for Therapeutic Abortion. (Berechtigung und die Methode der Unterbrechung der Schwangerschaft.) H. Fritsch.
86 Attempts at Non-operative Treatment of Carcinoma. (Ueber nicht operative Heilversuche beim Carcinom.) W. Zangemeister.
87 Improvement from Becoming Accustomed to Consequences of Accidents. (Gewöhnung an Unfallfolgen als Besserungstatsache.) G. Ledderhose.
88 Treatment of Acute Catarrh of the Middle Ear. (Behandlung des akuten Mittelohrkatarrhs.) H. Walb.
89 Etiology of Pertussis. (Aetiologie des Keuchhustens.) W. N. Klimanko.

82. **Incipient Dilatation of the Heart.**—Romberg declares that investigation of the total circulation and conditions elsewhere and the history of the case (chorea or rheumatism in the antecedents) will often enable an incipient organic heart affection to be diagnosed, even when percussion and orthodiagraphy give negative or dubious findings. It may be impossible otherwise to distinguish slight dilatation from enlargement of the heart from change of position or change in the percussion findings from unusually thick or much curving of the chest wall. He warns that, especially in the pathology of the heart, a single symptom is generally of little value for the diagnosis, as, for instance, when dyspnea on exertion with early fatigue suggests an incipient heart disease or a still latent cancer. Much obesity, affections of lungs or kidneys liable to impose extra work on the heart, disturbances from a thyroid affection, a peculiar thickness of the walls of blood vessels in the young, and, above all, sclerosis of the ascending aorta, testify to incipient heart disease and, in case of associated organic and functional disease, reveal what part of the syndrome is referable to each of these factors. It is thus possible to avoid the too frequent mistake of overlooking the comparatively insignificant organic affection in the more striking functional syndrome.

83. **Importance of Cellulose for Diet of Diabetics.**—Schmidt and Lohrisch announced last year that certain diabetics were able to tolerate cellulose and that they had found this fact useful in the dietetic treatment of such patients, as mentioned in THE JOURNAL at the time, Jan. 4, 1908, page 81. They gave the cellulose then in form of a desiccated vegetable preparation, but since have found that a preparation of agar-agar is better tolerated and supplies more nourishment in proportion. Patients unable to ingest 10 gm. of grape sugar or 20 gm. of starch without appreciable increase in the elimination of sugar were able to tolerate perfectly from 18 to 36 gm. of the hemicellulose supplied in a pulverized preparation of agar-agar. It can be mixed with a beverage or soup without impairing the taste. The healthy can assimilate as much as 60 gm. or even more a day, from 25 to nearly 75 per cent. being utilized, the proportion larger the smaller the amount ingested. Fully 72.5 per cent. was utilized by a patient with chronic constipation who took 240 gm. in three days—this experience confirming the author's previous announcements in respect to extremely thorough digestion of the food being the main factor in chronic constipation. The food is assimilated so completely that no waste is left to maintain the functioning of the intestines. Dissolved in cold water the preparation has prompt reducing power and deflects light slightly to the left, but forms no gas with yeast. After boiling, the tests show that the plane of polarized light is deflected to the right, and that the sugar formed is galactose. After complete hydrolysis with 2 per cent. hydrochloric acid, 67.8 per cent. of the dried residue is sugar, and almost exclusively galactose. The agar hemicellulose is thus galactan. Clinical research has shown that this is only gradually absorbed from the ingested preparation, and this slow, gradual assimilation is the principal reason, they think, for its toleration by the diabetic.

84. **Localization in Brain of Disturbance in Orientation.**—Pick has observed a case of a peculiar disturbance in orientation, the patient having the impression that his environment was turned around horizontally for about 180 degrees. He has further encountered this disturbance in two insane patients, and Kolb has recently reported a case with autopsy findings. All this evidence sustains the assumption of the localization of the primary lesion in the semicircular canals, and that localization of the process in the parietal lobe partially responsible for the symptom is possible if greater attention is paid to this disturbance and the details of more cases published.

85. **Interruption of Pregnancy.**—Fritsch delivered this address at the recent "Naturforscher Congress." He reviews the various conditions which justify interruption of a pregnancy, mentioning that he has been called in consultation five times in the last forty years for women already moribund from uncontrollable vomiting of pregnancy. The only reasonable advice then was to let the women die in peace, but he is confident that if the uterus had been emptied in time, these lives might have been saved. Tuberculosis is the only other indication he admits for interruption of a pregnancy, and in both these conditions he would not sanction it unless the patient were in a hospital where the physician could see for himself the failure of other suitable measures. In respect to tuberculosis, he states that he has had cases in his experience in which a tuberculous affection healed under fresh-air treatment during the pregnancy, and no recurrence has been observed in subsequent pregnancies. In such cases much depends on the financial condition of the patient. He adds that there is scarcely any other condition in which the physician must study and ponder as in a case of pregnancy plus tuberculosis. If the uterus is to be emptied, he warns that this should be done very slowly and cautiously in imitation of Nature's methods, and never outside of a hospital, both in the interests of the patient and for external reasons, adding that unskilful management of the abortion is more dangerous for the patient than to allow the pregnancy to run its normal course. He describes his simple technic, saying that the various steps can not be taken at arbitrary moments, but must follow the course of the natural processes and signs as they develop—another reason for institutional environment.

Medizinische Klinik, Berlin

November 8, IV, No. 45, pp. 1707-1746.

90 *Treatment of Abortion. (Abortbehandlung.) F. Engelmann.
91 *Investigation of Stomach and Intestines by Bismuth Method. (Untersuchung des Magens und Darmes mit der Wismuth-Methode.) Albers-Schönberg.
92 *Absolute and Relative Indications for Administration of Alcohol in Certain Nervous Conditions. (Alkoholanwendung bei einigen nervösen Zuständen.) H. Röder.
93 Is Coffee a Beverage or a Poison? (Genuss und Gift.) W. Sternberg.
94 Tonics. (Tonika.) W. N. Clemm.
95 Physicians in Politics. (Die Aerzte als Politiker.) L. Hirsch.

90. **Treatment of Abortion.**—Engelmann has been collecting data from 80 general practitioners in town and country in his vicinity at Dortmund, and finds that they all, as a rule, follow the technic which he advocates. Expectant tamponing of the vagina is practiced in many cases with good results. In other cases, especially during the first months of pregnancy, the curette is preferred, and almost invariably by those with the largest experience. He thinks that the estimate of 10 or 20 abortions in every 100 pregnancies is rather below the actual figures. The curette should never be small or sharp. To prevent recurrence of abortion, the first measure must be to postpone for a time the next pregnancy, and, in case of syphilis, specific treatment. In dubious cases the new serum test will give the clue to treatment. If the cause of the abortion was a trauma or if there are grounds for assuming that the uterus is unduly irritable, everything tending to induce a shaking up of the body should be avoided. Above all, strict repose at the dates corresponding to the menses

should be enforced. Only when the first critical months are over may a little more freedom be permitted. In case the skin is sensitive, all chilling should be avoided which might lead to harmful congestion in the interior, and the abdomen should be protected by suitable clothing, the food should be easy of digestion, and the bowels should be kept open. Some give sedatives for a long time; for this asafetida and viburnum are preferable.

91. **Roentgen Examination of the Digestive Tract.**—Schönberg gives an illustrated description of his technic for examination of the stomach and intestines and the deductions therefrom.

92. **Alcohol in Nervous Disturbances.**—Röder remarks that no one applies to a physician, as a rule, until home remedies have been exhausted, and that alcohol in some form is almost certain to have been among them. He protests against alcohol in any form in ptosis of the stomach or intestines, as this is not a local affection, but is associated with nervous and other disturbances. He has been surprised at the coincidence of enlargement of the thyroid and tendency to hernia with enteroptosis. The physical and nervous disturbances which forbid the use of alcohol in case of enteroptosis in many cases do not develop until the age of 25 to 28. Among his patients with concussion of the brain, not one had previously been warned by his physician to refrain from alcohol. On the contrary, nearly every one who had had slight concussion of the brain had been given alcohol by those assisting after the accident, including physicians. To his question: "Did it help you?" the answer was always in the negative. Any concussion of the brain contraindicates alcohol, and many physicians refuse to treat traumatic nervous affections unless the patients go to a hospital where abstention from alcohol will be enforced. Traumatic nervous affections tend to induce hysteria, and the necessity for abstention from alcohol in hysteria and neurasthenia and conditions of dread and compulsion can never be too often emphasized. The patient is chained to his crutch and soon is unable to do without it if alcohol is given to relieve him. A psychic trauma of any kind should contraindicate alcohol, as it is particularly liable to act abnormally in abnormal psychic conditions. He includes in this the period before and after an operation. He comments on the lack of attention paid to the fact that abstention from alcohol is an important factor in the warding off of the after-affections of gonorrhea and syphilis. The worst forms of tabes occur among those who take alcohol, and the lesser consumption of alcohol is one reason, he thinks, why women have the milder form. Among the injurious influences of syphilis must be counted, besides the virus, the emotional distress, the knowledge of the disease, the psychic depression and the necessity for secrecy, all of which render alcohol particularly injurious for syphilitics.

Mitteilungen aus den Grenzgebieten der Med. und Chir., Jena

XIX, No. 3, pp. 381-552. Last indexed Nov. 7, p. 1649.

96 *Local Tuberculin Reactions in Surgical Affections, Especially in Children. (Ueber Ergebnisse der Konjunktival- und Subkutantuberkulinreaktionen an chirurgischen Kanken, speziell bei Kindern.) A. Wolff-Eisner and S. Brandenstein.
97 *Sarcoma of the Esophagus. (Zur Kenntnis des Oesophagussarkoms.) v. Hacker.
98 *The Mechanics of the Cerebrospinal Fluid and Their Application to Spinal Anesthesia. (Mechanik des Liquor cerebrospinalis und ihre Anwendung auf die Lumbalanästhesie.) Propping.
99 Endothelioma of Gasserian Ganglion. R. Giani.
100 *Typhoid Pyonephrosis. K. Meyer and C. Ahreiner.
101 *The Ocular Tuberculin Reaction, Its Alleged Dangers and Its Value in Surgery. (Konjunktivalreaktion mit Tuberkulin, ihre angeblichen Gefahren und ihr Wert für die Chirurgie.) H. Zoeppritz.
102 Hysteric Contractures and Their Relations to Organic Affections. (Die hysterischen Kontrakturen und ihre Beziehungen zu organisch bedingten Krankheitszuständen des Menschen.) M. Trappe.

96. **Local Tuberculin Reactions in Surgical Affections.**—Wolff-Eisner and Brandenstein found only two dubious responses in 200 children tested by the ocular or cutaneous technic or both. The results confirm the absolute harmlessness of the ocular test made with a 1 per cent. solution of a special tuberculin. They advise a combination of the ocular and cutaneous technics. The response is just as reliable in the surgical as in the internal cases. The torpid form of scrofula gave negative findings, but the active form always gave the reaction.

97. **Sarcoma of the Esophagus.**—A case is reported by von Hacker and the details of twenty cases from the literature are tabulated for comparison. The prognosis is less favorable than with carcinoma. Death occurred in from two and a half to twelve months after the first symptoms in twelve cases. Besides operative measures, arsenic should be given freely, he says, as for sarcoma in the pharynx, occasionally changing the preparation.

98. **Mechanics of Cerebrospinal Fluid.**—Propping has been studying the cerebrospinal fluid from the standpoint of mechanics and physics, and his research throws a little more light on spinal anesthesia. Even a fluid of much greater specific gravity rapidly diffuses through the cerebrospinal fluid when the patient is in the dorsal decubitus. Consequently he advises raising the head after the operation to oppose this diffusion as much as possible. In every case the probable diffusion of the injected fluid to the medulla oblongata must be reckoned with, but it is impossible to foretell how long it will take. He warns emphatically against doing any long operation with the pelvis raised after a solution of higher specific gravity than the cerebrospinal fluid has been injected into the spinal canal.

100. **Typhoid Pyonephrosis.**—Meyer and Ahreiner report a case in a girl of 16, a chronic bacillus carrier. She had passed through measles, scarlet fever, whooping cough, pneumonia, typhoid with left pyonephrosis and diphtheria, all before the age of 9. Trouble recurred in the left kidney, and it was removed after eight months of symptoms. The typhoid bacilli were voided exclusively in the urine, which became sterile after the nephrectomy.

101. **The Ocular Tuberculin Reaction; Its Alleged Dangers and Its Value for Surgery.**—Zoeppritz reports the findings in 123 cases of various bone, joint, glandular and genital affections in which the ocular tuberculin test gave constantly a positive response when the process was of a tuberculous nature. As constantly the response was negative when the process was of other etiology. He uses a 1 per cent. solution of Koch's "old" tuberculin, and states that his experience has amply demonstrated the harmlessness of this technic. A negative response can be accepted, he says, as positively excluding tuberculosis in all "closed" affections of the above categories. With the "open" cases the verdict is less conclusive.

Münchenerr medizinische Wochenschrift

November 10, LV, No. 45, pp. 2313-2368.

103 *The Ocular Tuberculin Reaction. (Bedeutung der Konjunktivalreaktion nach 4,000 klinischen Beobachtungen.) A. Wolff-Eisner.
104 *Pathology of Epilepsy. M. Kauffmann.
105 *Prophylaxis of Pulmonary Tuberculosis. P. Harrass.
106 Internal Administration of Tuberculin and Similar Preparations. (Interne Anwendung von Tuberkulin und tuberkulinähnlichen Präparaten.) A. Moeller.
107 Compound Fractures of the Skull. (Komplizierte Schädelfrakturen.) A. Schönwerth.
108 Radical Operation for Epigastric and Subumbilical Hernias of the Linea Alba by Transverse Incision of the Fascia and Separating the Muscles. F. Brüning.
109 Anesthetization of the Eye and Its Appendages. (Zur Methodik der Anästhesierung des Auges und seiner Adnexe.) Messmer.
110 Kefir in Chronic Digestive Disturbances of Infants. (Kefir als Säuglingsnahrung bei chronischen Verdauungsstörungen.) Tollens.
111 Necessity for Complete Correction of Myopia in Children. (Vollkorrektion der Kurzsichtigkeit im Kindesalter, eine erzieherische Notwendigkeit.) K. E. Weiss.

November 17, No. 46, pp. 2369-2416.

112 Choreoasthenic Dementia with Juvenile Nodular Hyperplasia of the Liver. G. Anton.
113 Treatment of Syphilis with Highly Concentrated Mercurial Preparations. (Verwendung hochprozentiger Quecksilbermischungen zur Syphilisbehandlung.) K. Zieler.
114 *General Anesthesia with Part of Circulation Shut Off. (Narkose bei künstlich verkleinertem Kreislauf.) zur Verth.
115 A Frequent Affection of Certain Bones in Children. (Eine häufige, bisher anscheinend unbekannte Erkrankung einzelner kindlicher Knochen.) G. F. Haenisch.
116 Two Cases of Sutured Stab Wounds of Right Ventricle. (Stichverletzung der rechten Herzkammer. Herznaht.) M. Grasmann.
117 Rumination in Man. (Ruminatio humana.) Bruegel.
118 *Case of Raynaud's Disease. A. A. Lustig.
119 *Treatment of Megacolon. (Zur Kenntnis der Hirschsprungschen Krankheit.) Hellwig.

120 *Treatment of Appendicitis. H. Jaeger.
121 Abortive Pneumonia. Käppeli. Id. K. Rühl.
122 Exophthalmic Goiter in Connection with Tuberculous Affections. (Basedow im Anschluss an tuberkulöse Erkrankungen.) V. Hufnagel.

103. **The Real Significance of the Ocular Tuberculin Reaction.**—Wolff-Eisner has now an experience of 4,000 cases in which this test has been applied. Comparison of the course of the cases with the findings has demonstrated that a positive ocular reaction to tuberculin with his technic indicates an active tuberculous focus, while the subcutaneous and cutaneous methods give positive findings even with latent foci and hence are less instructive as a guide to treatment. The positive reaction to the ocular test in the apparently healthy threw discredit on the method at first, but time has revealed that these apparently healthy persons had some unsuspected active focus which later became evident. He discusses various features of the tuberculin reaction, especially the phenomena in certain cases in which the patients reacted with increasing fever to 1, 3 and 5 mg. of tuberculin subcutaneously, but, continuing with 7 and 9 mg., no further general reaction followed. Instead of this, there was intense flaring up of a preliminary cutaneous reaction (in one case simulating erysipelas, in another an immense furuncle). This paradoxic behavior he explains by assuming that there are two kinds of immunity to tuberculosis: immunity in respect to absorbable toxins and immunity to the tubercle bacilli. The latter immunity is a bacteriolytic property; the immunity to the toxins liberated by destruction of the bacilli is not an antitoxic property, but is due to the binding of the toxins by organic receptors which are found frequently in the connective tissue. The tuberculin goes to the points where the receptors are accumulated. These points are the disease foci or other points artificially made to behave like foci; that is, accumulating receptors. If the tuberculin is all bound by these receptors there will be only a local reaction, but if only partially or transiently bound there will be an attenuated or tardy focal and general reaction. He thinks that it is possible to create a nest of receptors in some neutral tissue, such as the connective tissue. These receptors will attract the tuberculin and localize the toxic action. He is convinced that it is possible to base on these facts a much more effectual and harmless tuberculin therapy and determine the indications. They differ with the different stages of the disease and the amount of production of lytic substances and of binding receptors. Knowledge of the binding conditions gives a new basis for Ehrlich's "experimental therapy."

104. **Pathology of Epilepsy.**—Kauffmann reports metabolic findings in epileptics which have convinced him that the disease is of toxemic origin in some cases. He believes that the brain and the skeleton are peculiarly sensitive to certain metabolic disturbances, and that epilepsy and rachitis should be referred to this origin. This suggests the possibility of more effectual treatment. The bromids have only a symptomatic action.

105. **Prophylaxis of Pulmonary Tuberculosis.**—Harrass declares that the local predisposition has been too much neglected hitherto, and that more can be done in developing the upper opening of the thorax and the respiratory muscles to ward off apical processes. Especially important in this line is the prevention and cure of scoliosis, particularly in families with a tendency to tuberculosis or rachitis. Medical students should be trained to recognize curvature of the spine in its incipiency, and physicians should be on the lookout in consultations, in family practice and in inspection of school children to recognize scoliosis and traces of rachitis, and then insist on measures to counteract the development of the phthisic thorax. He has found Kuhn's lung suction mask an important aid when gymnastic and respiratory exercises, sports, etc., are not sufficient alone.

114. **General Anesthesia with Part of Circulation Shut Off.**—This communication from Bier's clinic relates experiences with general anesthesia given after application of Esmarch's bandage to shut off the circulation in the legs. No attempt was made to have more than the usual amount of blood in the parts shut off, and no bandage was applied to the arms, on account of reports in the literature of injury of nerves after application of the Esmarch bandage to prevent hemorrhage during operations. The experiments on animals showed that a much smaller amount of the anesthetic sufficed for the general anesthesia and that the animals roused much quicker than the controls. The same technic applied in 100 cases in the clinic has failed to show any disadvantages or by-effects. One great advantage is that ether can be used instead of chloroform, robust men coming rapidly under the influence of ether by the drop method and requiring only a very small amount. When the bandage was removed from the legs the patients roused almost at once. In order to test the method, volunteers at the clinic had the bandage applied to all the four extremities. The pain was slight at first, but became unbearable after fifteen minutes. No appreciable changes in the pulse or blood pressure occurred. Verth regards the deadening of the sensibility of the patient before the operation by the scopolamin-morphin-ether technic as a great progress, and thinks that this artificial shutting off of part of the circulation will aid materially in reducing the dangers of general anesthesia. The most important advantage, however, is that after the operation the blood released from the legs rushes back and acts as a stimulant on the nerve centers, possibly from the influence of the carbon dioxid accumulated in it. Not the lack of oxygen, but the excess of the anesthetic, paralyzes the respiration center. The lacking carbon dioxid in the blood is supplied by the blood running from the legs after the bandages are cautiously removed.

118. **Raynaud's Disease.**—Lustig reports a severe case and discusses the treatment, which should aim to remove the cause by tonics, dieting, etc., and, especially in hysteria, psychotherapy. His patient showed polycythemia and diffuse arteriosclerosis. Considerable relief was obtained from venesection twice a year. It attenuated the phenomena observed and also the subjective disturbances.

119. **Hirschsprung's Disease.**—Hellwig reports a case in a young woman who had suffered from birth from obstinate constipation; sometimes intervals of two or four weeks elapsed between defecation. Serious ileus did not develop until the age of 21, when the anomaly in the intestine was remedied by an anastomosis between the transverse colon and the descending loop of the sigmoid flexure.

120. **Cupping in Treatment of Appendicitis.**—Jaeger, during the last year and a half, has treated six patients with appendicitis exclusively by stopping all food and applying from 16 to 20 dry cups to the right lower abdomen for about 23 minutes every 3 hours. The results have been so favorable that he urges general adoption of the measure as unable to do harm, while liable to give great relief. He advocates operative treatment, as a rule, using the cupping glasses only when surgical measures are contraindicated or while awaiting the surgeon.

Zeitschrift für klinische Medizin, Berlin

LXVI, Nos. 5-6, pp. 365-506. Last indexed Nov. 21, p. 1826.

123 Muscular Sense. (Zur Lehre vom Muskelsinn.) Goldscheider.
124 Laws of Sugar Elimination in Diabetes. (Gesetze der Zuckerausscheidung beim Diabetes mellitus.) S. Bernstein, C. Bolaffio and v. Westenrijk. Id. W. Falta.
125 Influence of Frenkel's Exercise Therapy on the Rapidity of Conduction in the Peripheral Centripetal Neuron in Tabes. (Einfluss der Frenkelschen Uebungstherapie auf die Leitungsgeschwindigkeit im peripheren zentripetalen Neuron bei Tabes dorsalis.) D. de Vries Reilingh.
126 Distribution of Nitrogen in Hypertrophied Myocardium. (Verteilung des Stickstoffes im hypertrophischen Herzmuskel.) J. Bence.
127 Perisigmoiditis and the Pelvic Forms of Appendicitis. (Ueber die Perisigmoiditiden und die Beckenformen der Appendizitis.) W. Obrastzow.
128 Relations of "Sound" Method of Determining the Maximal and Minimal Blood Pressure to Other Methods, and Interpretation of Findings. (Beziehungen der Tonmethode der Bestimmung des Maximal- und Minimal-Blutdrucks zu den übrigen Methoden und über die Bedeutung dieser Grössen.) N. van Westenrijk.
129 *European Chyluria. A. Magnus Levy.

129. **Chyluria.**—Magnus-Levy states that the expulsion of the parasites is the first step, if any are present. The eggs of the *Tenia nana* and *Eustrongylus gigas* have been found in some of the European cases, of which 50 are on record. Among this number were 4 with diabetic symptoms, and he has en-

countered another of this kind. The chyluria is evidently an affection of the lymphatic system, and the functioning of various organs may become secondarily disturbed. In one case the chyluria had been observed for fifty-five years, but had never caused much derangement. The disturbances are generally due to coagulation of the urine in the urinary passages, and symptomatic measures to keep the urine fluid are indicated. Fat in the diet seems to have an influence in this respect.

Zentralblatt für Chirurgie, Leipsic

November 28, XXXV, No. 48, pp. 1417-1456.

130 Extension by Means of Rod Passed Through the Bone. (Extension am quer durchbohrten Knochen.) E. Becker.

Zentralblatt für Gynäkologie, Leipsic

November 21, XXXII, No. 47, pp. 1521-1544.

131 Cancer Statistics. (Zur Karzinomstatistik.) O. v. Herff.
132 Constant Leakage of Amniotic Fluid. (Hydrorrhea gravidarum amnialis.) R. v. Fellenberg.
133 *Allowing Patients to Get Up Early After Laparotomies. (Zum frühen Aufstehen nach Laparotomien.) C. Hartog.

November 28, No. 48, pp. 1545-1568.

134 Pubiotomy with Moderately Contracted Pelvis. (Pubotomie bei mässig verengtem Becken.) W. Sigwart.
135 Toxicology of the Placenta. P. Mathes.
136 Improved Support for the Legs. (Beinhalter.) K. Holzapfel.

133. **Allowing Patients to Get Up Early After a Laparotomy.**—Hartog states that he was the first to introduce this innovation into Germany, where it has excited much discussion, but he adds that he obtained the idea from an article in THE JOURNAL, by Ries, in 1899.

Gazzetta degli Ospedali e delle Cliniche, Milan

November 8, XXIX, No. 134, pp. 1437-1452.

137 *Diagnostic Value of Roentgen Rays in Internal Medicine. (Valore diagnostico dei raggi Röntgen nella medicina interna.) V. Maragliano.
138 *Scapular Sound and Its Diagnostic Significance. (Rumore scapolare e del suo significato diagnostico.) E. Tedeschi.
139 Toxins of Helminths. (Ricerche cliniche sui veleni degli elminti intestinali, a proposito delle prove di Jefimov.) A. Borini.
140 Cutaneous and Ocular Tuberculin Reactions in Adults. (Sulla cutied oftalmo-reazione tubercolinica nell'adulto.) B. Nicola.
141 Indications for Picric Acid. L. Zanetti.

November 15, No. 137, pp. 1469-1484.

142 Precipitin Test for Latent Purulent Processes. (Diagnosi biologica di raccolte purulente latenti.) E. Tedeschi.
143 Favorable Results of Treatment with Suprarenal Extract of the First Case of Osteomalacia. (L'esito finale del primo caso di osteomalacia tratato col metodo Bossi.) S. Rebaudi.
144 Coagulating Power of Blood and Elimination of Lime in Urine in Deméntia Præcox. (Potere coagulante del sangue ed eliminazione del calcio per le orine nella demenza precoce.) A. Perugia.

137. **Roentgen Rays in Diagnosis of Internal Diseases.**—Maragliano concludes his remarks on this subject by deploring that the Roentgen technic as yet does not allow of its diagnostic application in the acute diseases. He trusts that the near future will witness the simplification of the apparatus and improvement in the technic so that in severe acute disease early Roentgen differentiation may be possible.

138. **Sound in the Scapula and Its Diagnostic Significance.**—The sound to which Tedeschi refers is elicited in the scapular region by moving the arm to and fro as the patient breathes deep. Applying the hand on the scapular region a sensation as of fremitus is perceived or a creaking sound is heard if the ear is applied to the region. The patients sometimes call the physician's attention to this region by complaining of spontaneous pain, and there is generally tenderness with the sound. He has encountered it in 58 patients; in 32 there were signs of incipient tuberculosis, while 17 were in an advanced stage of the disease, and 9 were anemic and weak, but no clinical signs of tuberculosis were evident. He accepts the scapular sound as evidence of a tuberculous process in the lungs, possibly still latent.

Policlinico, Rome

November, XV, Surgical Section, No. 11, pp. 473-520.

145 *Non-auditory Lesions of the Internal Ear. (Lesioni del labirinto non acustico dimostrate con ricerche sperimentali e cliniche.) A. Torretta. Commenced in No. 12.
146 Two Rare Cases of Sarcoma of the Spermatic Cord. (Sarcoma del funicolo.) M. Fasano.
147 *Causes Inducing Functional Disturbance in the Circulation and Respiration During Chloroform Anesthesia. (Su alcune cause di turbe funzionali cardio-respiratorie durante la cloroformizzazione.) A. Messeri.

145. **Experimental and Clinical Research on Lesions of the Semicircular Canals.**—Torretta's extensive monograph, commenced in the April number, is just concluded. Most of the experimental work was done on fowls, as they show most readily any disturbance in balance. The horizontal or superior semicircular canal or both were isolated and resected or merely cocainized or paraffin was injected into the internal ear, sparing the membranous labyrinth, to study the action of pressure, etc., on the semicircular canals. Also, in guinea-pigs, the fluid in the internal ear was evacuated and the effects studied. The clinical research included 100 cases of lesions of the non-auditory portion of the internal ear; several typical cases are reported in detail. The phenomena observed show that nystagmus, the various ocular reflexes and vertigo may be regarded as symptoms of irritation of the semicircular canals. Disturbances in balance are a symptom of loss of functioning, especially when the symptoms of irritation are lacking. Among the arguments in favor of the assumption that nystagmus is a symptom of irritation and not of loss of function is the fact that there is no nystagmus with complete destruction of the epithelium of the semicircular canals, while it accompanies the acute forms of middle-ear disease and the chronic forms in which the semicircular canals are not involved. Also that the nystagmus can be induced by artificial irritation of the labyrinth, and that it subsides and disappears as the otitis improves and heals. Also by the fact that physiologic nystagmus can be induced more readily in the young than in the aged and most readily in individuals with especially sensitive nervous system. This is probably due to hypersensitiveness of the nervous system in general and of the semicircular canals in particular. In one of his cases in which there was complete destruction from the effects of a firearm wound, it was impossible to elicit nystagmus or vertigo by any artificial stimuli. Nystagmus is an important symptom, further, as it can not be deceptively simulated. It is one of the early symptoms, and may have subsided before the patient comes under medical observation. When it appears late in the case it is generally a sign of some complication beyond the labyrinth. He reports a case of this kind; the labyrinth had been entirely destroyed by a purulent process, and the nystagmus was evidently due to the complicating meningitis. The principal characteristic of simple irritation of the semicircular canals is its transientness, but it is liable to persist indefinitely until the cause is removed.

147. **Reflexes During Chloroform Anesthesia.**—Messeri has been studying the behavior of the reflexes under chloroform, and he has become convinced that some of the functional heart and respiration disturbances are the result of reflex action from the field of operation. Certain regions are more liable than others to elicit such reflexes. Among them are the testicles, the spermatic cord, hernia, the peritoneum and all points where the mucous membrane joints the skin, as at the anus. The intensity of the reflex also varies with the nervous condition. In anemia, infections, intoxications, psychoneuroses, etc., the reflex excitability should be tested before an operation, he thinks, and chloroform should be used with exceptional care in the cases with hyperexcitability. He is confident that the chlorform is unable to abolish all reflex action, especially in the more distant regions. The danger from chloroform syncope is imminent throughout, but he thinks it is more liable toward the close of the anesthesia from the depression induced by the chloroform. His conclusions favor administration of morphin an hour or more before the operation on all extremely excitable patients, and for all operations in regions known to be particularly liable to induce reflex action. Deep chloroform anesthesia should be reserved for the stage of the operation in which it is indispensable, and for those operations which require relaxation of the muscles. Since he has preceded the chloroform with morphin, he has never had any mishaps from chloroform or ether. Very much smaller amounts are required when a sedative is given beforehand. He describes three cases in detail in which threatening syncope was observed under chloroform in operations on the inguinal region and epididymis.

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September 16, LI, No. 38, pp. 1089-1112.

148 *Diagnosis of Motor and Secretory Functioning of the Stomach. (Diagnosen af Ventriklens Motilitet og Sekretion.) F. Svendsen. Commenced in No. 37.

September 23, No. 39, pp. 1113-1136.

149 Roentgen Diagnosis of Stones in Kidney and Ureter. (Om Diagnosen af Nyre- og Uretersten ved Hjælp af Röntgenstraaler.) P. K. Faber.

September 30, No. 40, pp. 1137-1160.

150 *Constitutional Causes of Hemorrhage from the Lungs. (Om konstitutionelle Aarsager til Lungeblødninger.) N. J. Strandgaard.

October 7, No. 41, pp. 1161-1184.

151 Nitrite Poisoning from Bismuth in Roentgen Work. (Tilfælde af Nitritforgiftning efter intern Anvendelse af subnitras bismuthicus ved Röntgenundersøgelse.) R. W. Klær.

October 21, No. 43, pp. 1209-1232.

152 Glandular Fever. ("Drüsenfieber" Pfeiffer.) K. Schaffer.

148. **Diagnosis of Motor and Secretory Functioning of the Stomach.**—Svendsen presents here a detailed study of several dozen cases of various functional gastric disturbances, his aim being to show that it is possible even for the busy general practitioner to make a few simple functional tests which will allow him insight into the conditions in the particular case for effectual treatment. He tabulates for comparison the findings in 12 cases of motor insufficiency, 2 of simple gastroptosis, 5 of simple hypersecretion, 1 of the same plus hypermotility and several with motor insufficiency plus hypersecretion or of hypermotility alone. He uses three procedures: 1. Aspiration of the stomach content with a bulbed tube; 2, rinsing out the stomach with 300 c.c. of water, and, 3, rinsing out the stomach with the largest possible amount of water to remove every trace of solid content. These three procedures are done on the fasting stomach, again one hour after an Ewald-Boas test breakfast and again two and a half hours after the test breakfast. The second procedure is the application of the Mathieu method to determine the exact quantity of the stomach contents. After removal of a small amount of stomach content, 300 c.c. of water are poured through the tube and then withdrawn. The quantity of the original contents is equal to the number of c.c. of water poured in, multiplied by the acidity present after its addition, divided by the result of subtraction of the second acidity from the first, and adding the portion withdrawn on the first occasion. In Svendsen's tables the findings with each of the three procedures are tabulated in three columns, one showing the stomach content first aspirated, the second column the acidity, and the third the total amount, calculated according to the Strauss "sedimentation test." A high "sedimentation quotient" with normal or reduced total amount is encountered in cases of dilatation of the stomach, with or without gastritis, and in nervous dyspepsia—all distinguished by impairment of motor activity. He protests against the assumption that motor insufficiency is the result of imperfect development or lesser energy in the musculature of the stomach. It is manifested by an especially large amount of filtrate in a normal or unusually small amount of total content; this is partly the result of the reciprocal action between the contracting musculature in the pylorus and the expelling force of the stomach, and is partly dependent on the degree of acidity in the stomach. On the other hand, hypermotility is not the expression of unusual development or energy in the musculature of the stomach, but is a functional anomaly which causes the rapid emptying of the stomach, and is dependent likewise on the reciprocal action between the pyloric sphincter and the expelling forces of the stomach. The history of the case and application of the above procedures, with chemical and physical study of the stomach content, do not require expert skill. He regards a total content of 120 and up, with a high sedimentation quotient, as the type of motor insufficiency, while hypersecretion or excessive production of mucus accompanies the type with a total content of 120 or under, with a sedimentation quotient of 1/5 or less. When both types are combined both total stomach content and filtrate are unusually large. He accepts as the normal condition a stomach content of from 50 to 120 c.c. unfiltered, the filtrate not over 25 and the sedimentation quotient less than ¼ or 1/5, with a total acidity of from 40 to 60.

150. **Constitutional Causes for Hemoptysis.**—Strandgaard points out that not merely the stage of the disease, but also the build of the patient, whether his heart is of proper size for his height and weight, chronic alcoholism, habitually high blood pressure, and mixed infection should be considered in connection with the tendency to hemoptysis, as also the mode of life, etc.

Books Received

Acknowledgment of all books received will be made in this column and this will be deemed by us a full equivalent to those sending them. A selection from these volumes will be made for review, as dictated by their merits, or in the interests of our readers.

THE NATIONAL STANDARD DISPENSATORY. Containing the National History, Chemistry, Pharmacy, Actions and Uses of Medicines, including those recognized in the Pharmacopeias of the United States, Great Britain and Germany, with many references to other foreign pharmacopeias. In Accordance with the Eighth Decennial Revision of the U. S. Pharmacopeia, by authorization of the Convention. By Hobart Amory Hare, B.Sc., M.D., Professor of Therapeutics and Materia Medica in Jefferson Medical College, Philadelphia; Charles Caspari, Jr., Ph.G., Pharm.D., Professor of Theoretical and Applied Pharmacy in the Maryland College of Pharmacy, Baltimore; and Henry H. Rusby, M.D., Professor of Botany and Materia Medica in the College of Pharmacy of the City of New York; with valuable assistance from Edward Kremers, Ph.D., Daniel Base, Ph.D., and Joseph F. Geisler, Ph.C., 2nd Revised Edition. Cloth. Pp. 2050, with illustrations. Price, $6.00. Philadelphia: Lea & Febiger, 1909.

MODERN MEDICINE. Its Theory and Practice. In Original Contributions by American and Foreign Authors. Edited by William Osler, M.D., Regius Professor of Medicine in Oxford University, England. Assisted by Thomas McCrea, M.D., Associate Professor of Medicine and Clinical Therapeutics in Johns Hopkins University, Baltimore. Volume V, Diseases of the Alimentary Tract. Cloth. Pp. 903, with illustrations. Price, $6. Lea & Febiger, 1908.

STUDIEN UEBER DIE BEI PERITONÄALEN INFEKTIONEN APPENDIKULÄREN URSPRUNGS VORKOMMENDEN SAUERSTOFFTOLERANTEN SOWIE OBLIGAT ANAËROBEN BAKTERIENFORMEN mit besonderer Berücksichtigung ihrer Bedeutung für die Pathogenese derartiger Peritonitiden. Von Birger Runeberg, Assistenzarzt an der Chirurgischen Universitäts-Klinik zu Helsingfors. Paper. Pp. 303, with illustrations. Berlin: Verlag von S. Karger.

UEBER DEN ANATOMISCHEN BAU DES CONUS UND DER ADERHAUTVERÄNDERUNGEN IM MYOPISCHEN AUGE. Inaugural-Dissertation zur Erlangung der Doktorwürde einer Hohen medizinischen Fakultät zu Helsingfors. Vorgelegt von Emil Behse, Assistenzarzt an der Universitätsaugenklinik in Helsingfors, Finnland. Paper. Pp. 60, with illustrations. Leipzig: Wilhelm Engelmann, 1907.

THE SYSTEMATIC RELATIONSHIPS OF THE COCCACEAE with a Discussion of the Principles of Bacterial Classification. By Charles Edward Amory Winslow, Assistant Professor of Biology at the Massachusetts Institute of Technology, and Anne Rogers Winslow. First Edition. Cloth. Pp. 300. Price, $2.50. New York: John Wiley & Sons, 1908.

BAKTERIOLOGISKA UNDERSÖKNINGAR AF DE KVINLIGA GENITALSEKRETEN UNDER FÖRLOSSNINGEN OCH BARNSÄNGEN MED SÄRSKILD HÄNSYN TILL FROGAN OM DEN PUERPERALA AUTOINFEKTIONEN. Af Valter Wegelius, Med. Lic. Paper. Pp. 226, with illustrations. Helsingfors, 1908.

ANATOMISCHE VERÄNDERUNGEN IN VIER WEGEN DRUCKSTEIGERUNG ENUKLEIERTEN AUGEN MIT NETZHAUTHÄMORRHAGIEN. Von Anna Dahlstrom, Med. Lic. Paper. Pp. 148, with illustrations. Leipzig: Druck von Alexander Edelmann, 1908.

ESSENTIALS OF MEDICINE. By Charles Phillips Emerson, M.D., Late Resident Physician, The Johns Hopkins Hospital. Cloth. Pp. 383, with illustrations. Price, $2. Philadelphia: J. B. Lippincott Co.

SYNTHÈSE ET CONSTITUTION DES ALBUMINOÏDES. (Les Actualities Chimiques et Biologiques, No. 10) Par M.—Emm. Pozzi-Escot. Paper. Pp. 110. Price, 1.50 francs. Paris: Jules Rousset, 1909.

THE DOCTOR IN ART. A Volume of Twenty-five Reproductions of World-Famous Masterpieces. Edited by Charles Wells Moulton. Cloth. Buffalo: The Douglas Publishing Co.

LES MERVEILLES DE L'HYPNOTISME. Par Geraud Bonnet, Médecin Practicien à Oran. Paper. Pp. 281. Price, 3.50 francs. Paris: Jules Rousset, 1909.

REPORT OF THE COMMISSION OF EDUCATION FOR YEAR ENDED JUNE 30, 1907, Vol. 1. Cloth. Pp. 522. Washington: Government Printing Office, 1908.

AMERICAN SOCIETY OF TROPICAL MEDICINE. Papers read before the Society and Published Under Its Auspices. Vol. 3, 1907-1908. Paper.

HINTS TO SHIPS' SURGEONS. By J. F. Elliott, L.R.C.S., L.R.C.P. Cloth. Pp. 64. Price, 2s. London: John Bale, Sons & Danielson, Ltd.

THE ARKANSAS DOCTOR. A Photogravure, size, 22x28. Price, $3.00. Brooklyn, N. Y.: David Bruce Conklin, 578 Jefferson Ave.

TRANSACTIONS OF THE MAINE MEDICAL ASSOCIATION, 1908. Vol. XVI. Part II. Paper. Pp. 444. Portland: Stephen Berry Co., 1908.

USE AND CARE OF MICROTOME. Bausch & Lomb Optical Co., Rochester, N. Y. Paper. Pp. 32. For gratuitous distribution.

LA GYMNASTIQUE RAISONNÉE. Par Eugène Paz. Paper. Pp. 256. Price, 2 francs. Paris: Jules Rousset, 1909.